

***Data Quality Assessment
Report for the
Post-Decontamination
Characterization of the
Contents of Tank WM-184 at
the Idaho Nuclear Technology
and Engineering Center Tank
Farm Facility***

August 2004

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Technology and Engineering Center Tank Farm
Facility**

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ABSTRACT

This report documents the assessment of the data collected during the cleaning of Tank WM-184 at the Idaho National Engineering and Environmental Laboratory Idaho Nuclear Technology and Engineering Center Tank Farm Facility. The data assessed in this report were generated from the sample analysis of residual tank liquids remaining after decontamination. Because decontamination activities reduced the volume of solids remaining in the tank to less than 15% by volume of the total sample collected, the solids portion of the samples collected were not analyzed and compared with the action levels for regulated constituents. Data from the sample analysis of the liquids from the tank vault sumps or diversion valve boxes are not analyzed in this document but will be addressed in a subsequent report. The residual tank liquids data were assessed to determine whether the concentrations of regulated constituents were reduced below the action levels necessary for clean closure. Radionuclide data were compared with an established inventory. The analysis shows all radionuclide activities are less than the inventory values modeled in the tank performance assessment. The analysis also shows that clean closure action levels were achieved for the chemical constituents in the tank. Based on the data analysis, decisions associated with these data can be made with a high degree of confidence.

FOREWORD

Tank WM-184 is one of 15 tanks at the Idaho National Engineering and Environmental Laboratory Idaho Nuclear Technology and Engineering Center Tank Farm Facility. The cleaning of Tank WM-184 was performed as part of the Resource Conservation and Recovery Act (RCRA) clean closure and Department of Energy (DOE) high-level waste tank closure activities underway at the Idaho Nuclear Technology and Engineering Center Tank Farm Facility. The data were compared to three criteria:

- For RCRA clean closure, the data were assessed to determine whether the concentrations of RCRA-regulated constituents were reduced to levels below the action levels specified for clean closure in *Idaho Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for Idaho Nuclear Technology and Engineering Center Tanks WM-184, WM-185, and WM-186* (DOE-ID 2004). This analysis indicates clean closure action levels were not exceeded by liquid contaminants in Tank WM-184. Because the samples collected contained less than 15% solids by volume, the solids portion of the samples collected were not analyzed and compared with the action levels for regulated constituents.
- For DOE high-level waste tank closure, the radionuclide data were compared with the radionuclide concentrations that were used in the *Performance Assessment for the Tank Farm Facility at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 2003). These values were based on sampling data and predicted values from the ORIGEN numerical model. This model is used to predict the radionuclides and relative values in waste streams. An inventory of radionuclides that remains in the tanks after decontamination was prepared for the performance assessment and is used in this document as an indicator of compliance with DOE radionuclide performance objectives.
- The data collected from sampling the post-decontamination, residual, liquid contents of Tank WM-184 were assessed against the criteria for data quality specified in the *Sampling and Analysis Plan for the Post-Decontamination Characterization of the WM-184, WM-185, and WM-186 Tank Residuals* (INEEL 2003).

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ACRONYMS

AL	action level
ANOVA	analysis of variance
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
CV	coefficient of variation
<i>df</i>	degree of freedom
DQA	data quality assessment
DQO	data quality objective
DOE	U.S. Department of Energy
HWMA	Hazardous Waste Management Act
ICP-MS	inductively coupled plasma-mass spectrometry
LCL	lower confidence limit
PA	performance assessment
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
TFF	Tank Farm Facility
UCL	upper confidence limit
USC	United States Code
VOC	volatile organic compound

Data Quality Assessment Report for the Post-Decontamination Characterization of the Contents of Tank WM-184 at the Idaho Nuclear Technology and Engineering Center Tank Farm Facility

1. INTRODUCTION

This report assesses the quality of data generated from liquid tank residuals collected following decontamination of Tank WM-184 at the Idaho Nuclear Technology and Engineering Center Tank Farm Facility (TFF). The purpose of this data quality assessment (DQA) report is to:

1. Verify that correct assumptions were made in the development of the data quality objectives (DQOs) about the variance of the sample population
2. Confirm that the number of samples collected was adequate
3. Compare the mean concentration (as represented by the upper confidence limit [UCL]) of Resource Conservation and Recovery Act (RCRA) (42 United States Code [USC] 6901 et seq., 1976) constituents to approved action levels (ALs) listed in the closure plan (DOE-ID 2004)
4. Compare the mean concentrations of radionuclides to the inventory prepared for the *Performance Assessment for the Tank Farm Facility at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 2003)
5. Determine if the data distribution is normal or log normal to justify the assumption that the sample mean has a normal distribution.

In general, DQA provides a scientific and statistical evaluation of data to determine if the collected data are of the right type, quality, and quantity to support their intended use. The DQA process is designed around the key idea that data quality, as a concept, is only meaningful when it directly relates to the intended use of the data (EPA 2000a). Two primary questions can be answered using the DQA process:

1. Does the quality of the data permit decisions to be made with the desired degree of confidence?
2. How well can the sampling design be expected to perform over a wide range of possible outcomes? That is, can the sampling design strategy be expected to perform well in a similar study with the same degree of confidence even if the actual measurements are different than those obtained in the present study?

The first question addresses the immediate needs of the study. If the assessment shows that the data are of sufficient quality, then the decision-maker can make decisions using unambiguous data with the desirable level of confidence (specified during data collection planning). However, if the data do not provide sufficiently strong evidence to support one decision over another, then appropriate data analysis can alert the decision-maker to the degree of ambiguity in the data. If this is the case, an informed decision can be made about how to proceed. For example, based on the data obtained, more data may be

collected or the decision-maker may make a decision knowing there is a greater-than-desirable uncertainty in the decision.

The second question addresses the potential future needs of the study. After the DQA is completed, personnel can determine how well the sampling design may perform at a different location given that different environmental conditions and outcomes may exist. Because environmental conditions vary from location to location, it is important to examine the sampling design over a large range of possible settings to ensure that the design will be adequate in other scenarios.

Evaluation of collected data, referred to as the data life cycle, consists of three steps: planning, implementation, and assessment. The planning phase consists of documenting the data needs and plans for data collection using the DQO process (EPA 2000b). The DQOs define the qualitative and quantitative criteria for specifying the sampling procedure and establish the desired level of confidence for decision-making. The DQOs for this project are documented in the associated sampling and analysis plan (SAP) (INEEL 2003). The implementation phase consists of collecting the necessary data according to the SAP. Data assessment consists of both data validation (to make sure that all sampling and analysis protocols were followed) and the use of the validated data set (to determine if the data quality is satisfactory for making the decisions specified in the SAP).

The following steps of the DQA process are discussed in this DQA report.

1. Review the DQOs and sampling design
2. Conduct a preliminary data review
3. Select a statistical test
4. Verify the assumptions of the selected test
5. Draw conclusions from the data.

2. REVIEW OF THE DATA QUALITY OBJECTIVES AND SAMPLING DESIGN

The DQOs clearly define the principle study questions and issues being addressed and develop the approach that will be taken to resolve that problem. The DQOs consist of developing a problem statement and a decision statement, defining the decision inputs, defining study boundaries, developing a decision rule, establishing decision error limits, and optimizing the design.

1. Problem Statement: Demonstrate that tank decontamination activities have resulted in closure performance objectives being met.
2. Decision Statement: Determine whether decontamination of the TFF tank systems reduced the concentrations of constituents or properties (i.e., pH) of concern in the residuals remaining in the TFF system components below closure performance standards; if not, further decontamination may be necessary or the Hazardous Waste Management Act (HWMA) (State of Idaho 1983)/RCRA (42 USC 9601 et seq., 1976) landfill standards for closure must be met. Department of Energy (DOE) requirements also must be met to close the tanks in place.
3. Decision Inputs: Concentrations of hazardous constituents and radionuclides present in the tanks after decontamination.
4. Study Boundaries:
 - a. Spatial Boundaries: Residual decontamination fluids remaining in the tanks following decontamination. The data assessed in this report were generated from the sample analysis of residual tank liquids remaining after decontamination. No data from the sample analysis of residual solids or the liquids from the tank vault sums or diversion valve boxes are analyzed in this report. Data assessment of sample analysis of ancillary equipment will be addressed in a subsequent report.
 - b. Temporal Boundaries: From the onset of decontamination to completion of decontamination. The length of time can vary from tank to tank. Decisions made concerning achievement of closure performance standards will apply for a minimum of 100 years of DOE institutional control.
 - c. Scale of Decision-Making: The assumptions made in developing the performance assessment (PA) (DOE-ID 2003) will specify the scale of decision-making.
 - d. Practical Constraints: It is not possible to obtain samples from all areas of the tank because of restricted access points and limitations on the available sampling methods.
5. Decision Rule: The parameter of interest is the mean concentration of the constituents of concern within the study boundaries. The decision rules are:
 - a. *If* the true mean (as estimated by the 95% UCL of the sample mean) concentration of any applicable hazardous waste constituent detected from the tank is greater than or equal to the maximum concentration of contaminants for the toxicity characteristic listed in 40 Code of Federal Regulations (CFR) 261.24 (2004), or *If* the true mean pH (as estimated by the lower confidence limit [LCL] and UCL of the 95% confidence interval of the sample mean for pH) of TFF residuals in any individual tank or vault sump exhibit the characteristic of

corrosivity, *then* either additional decontamination steps will be undertaken or closure to HWMA/RCRA landfill standards will be considered.

- b. *If* the true mean (as estimated by the 95% UCL of the sample mean) concentration of any hazardous constituent detected in total constituent analyses of the TFF residuals is greater than or equal to the AL specified in the closure plan, *then* additional decontamination steps may be undertaken. Closure to HWMA/RCRA landfill standards will be considered at final closure of the TFF.
 - c. *If* the concentrations of hazardous constituents indicate that the closure performance standards have been met, *then* the TFF will be closed under a HWMA/RCRA clean closure.
6. Decision Error Limits: The outputs for the decision error limits are the null and alternative hypotheses and a quantification of the allowable error rates. The null hypothesis is “The concentration of at least one hazardous or radioactive constituent in TFF residuals following decontamination is equal to or exceeds action or inventory levels.” Conversely, the alternative hypothesis is “The concentrations of all hazardous or radioactive constituents in TFF residuals following decontamination are less than the specified action or inventory levels.” The lower boundary of the gray region (Δ) is set at 80% of the AL for all constituents of concern. Using the stated null hypothesis, the upper boundary of the gray region is always the constituent-specific AL. For pH, the gray region is bounded on one side by 2.0 and 12.5 (the ALs) and on the other side by 2.1 and 12.4, respectively. In the case of acidic conditions (low pH), the “lower boundary” of the gray region is actually a pH value greater than the action limit because the “lower boundary” of the gray region is always in a direction away from the action limit that would result in rejection of the null hypothesis if the true mean value was equal to that value. That is, the gray region is that range of values where controlling false-negative decision error is deemed unimportant relative to the cost of controlling that error. The chance of a false-positive decision error (α) and the chance of a false-negative decision error (β) will both be set at 5%.
7. Design Optimization: A simple random sampling method was used to obtain samples. The standard deviation (σ) was estimated to be 10% of the AL. The validity of this assumption is assessed later in this DQA report. Given the chosen α , β , and Δ in conjunction with the estimated value for σ , a sample size (n) of five was selected using Equation (1):

$$n = \frac{(z_{1-\alpha} + z_{1-\beta})^2 \sigma^2}{\Delta^2} + \frac{1}{2} z_{1-\alpha}^2 \quad (1)$$

where

- n = the appropriate number of samples to collect to satisfy the DQOs
- z_x = the z value for the x^{th} quantile of the standard normal distribution (from statistical tables)
- α = false-positive rate (5% or 0.05)
- β = false-negative rate (5% or 0.05)
- σ = estimated standard deviation of the population

Δ = minimum detectable difference (the difference between the AL and the value at which the decision-maker wants to specify a false-negative decision error rate; in this case, Δ is 20% of the constituent-specific AL).

Equation (2) shows the solution of this formula for the Tank WM-184 sampling and analysis activity:

$$n = \frac{(1.645 + 1.645)^2 (10)^2}{(20)^2} + \frac{1}{2} (1.645)^2 = 4.06 \quad (2)$$

Based on the results of Equation (2), five samples of the residual decontamination fluids remaining in the tank were collected for the applicable analyses.

3. PRELIMINARY DATA REVIEW

The purpose of the preliminary data review is to examine the data using graphical methods and numerical summaries to gain familiarity with the data and achieve an understanding of the “structure” of the data. A preliminary data review should be performed whenever data are used, regardless of the data use. This type of examination allows for identification of appropriate approaches for further analysis and limitations of the data. The two main approaches to a preliminary data review are: (1) calculation of basic statistical quantities (or summary statistics) and (2) graphical representations of the data. Appendixes A–E of this report provide the graphical representation of Tank WM-184 data. The calculated summary statistics will be discussed in this section, and the graphical review of the data will be discussed in Sections 7.1–7.5 when distribution of the data is assessed.

The summary statistics that were calculated for the detected constituents were measures of center (mean and median) and measures of spread (standard deviation, coefficient of variation [CV], interquartile range, and range). One measure that is of primary interest is the center of the data. The average (\bar{x}), or the mean, is the most commonly used measure of the central tendency of the data. However, it can be heavily influenced by outliers and by asymmetric data. The mean is calculated using Equation (3):

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n} \quad (3)$$

where

\bar{x} = mean

n = number of observations

x_i = i^{th} observation.

The median is the preferred measure of the center of the data if outliers are present in the data or if the data are skewed. The median is the observation such that 50% of the data lie below the median and 50% of the data lie above the median. If the data are symmetric, the mean and the median will be equal to each other.

Another quantity of interest is the spread of the data. The standard deviation (s) is the most commonly used measure of spread. One reason for this is that it is fairly easy to interpret and is used in many other statistical methods. Because it is calculated using the average, it is also sensitive to outliers and to data that are not symmetric. The standard deviation is calculated using Equation (4):

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}} \quad (4)$$

where

s = standard deviation

n = number of observations

x_i = i^{th} observation

\bar{x} = mean of the observations.

The CV was also calculated for each detected analyte. The CV is a relative measure of variation. That is, it is a measure of the standard deviation relative to the mean, expressed as a percentage. This measure provides a way to directly compare the standard deviations of two different data sets that may otherwise not be directly comparable. However, it is important to note that the mean of the data may be very close to zero or very far away from zero and the spread may be independent of the distance of the mean from zero. Therefore, no firm guidelines have been established for interpreting the CV. The formula for calculating the CV is shown in Equation (5):

$$CV = \frac{s}{\bar{x}} \times 100\% \quad (5)$$

where

s = standard deviation

\bar{x} = mean of the observations.

The interquartile range is a measure of spread that is not influenced by outliers. It is calculated by subtracting the first quartile from the third quartile. The first quartile is the 25th percentile of the data and the third quartile is the 75th percentile of the data. The interquartile range is a preferred measure of spread when extreme outliers exist in the data. Otherwise, the standard deviation is the preferred measure of spread.

Another measure of spread is the range of the data. The range is calculated by subtracting the smallest value in the data from the largest value. It can be a valuable piece of information in characterizing the spread of the data but can be deceptively large if the data contain any outliers. Therefore, the data should always be examined for outliers when the range is used as a summary statistic.

The five-number summary was calculated for pH and each of the detected inorganic, organic, and radionuclide analytes. The five-number summary is a presentation of the minimum value, the first quartile, the median, the third quartile, and the maximum value of the data. This summary provides non-parametric information about the general spread and pattern of the data.

It is difficult to read a table of numerical summary statistics and identify the degree of symmetry or normality of the data. Therefore, the graphical representations are shown in Appendixes A–E to aid the data user in assessing the symmetry and normality of the data collected. Graphical representations of the data include boxplots and normal-quantile plots. Boxplots are a way of graphically viewing the five-number summary. The plot consists of a central box with a line or other mark inside of the box. Two lines come out of the ends of the box in either direction. The line, or mark, inside the box identifies the median, the edges of the box are located at the two quartiles, and the extreme ends of the lines represent the largest and smallest observations within 1.5 times the interquartile range from the box, which are the

minimum and maximum values in this study. This type of plot allows for a quick and comprehensive analysis of the symmetry of the data. It can be easily determined if the data are symmetric, right-skewed, or left-skewed. Right-skewed data have a lengthened tail at the higher values of the distribution. This tail pulls the mean toward it, causing the mean to be high relative to the center of the data. This makes it more likely that a tank will be declared insufficiently decontaminated when, in fact, it is sufficiently clean. Left-skewed data have a lengthened tail at the lower values of the distribution. This tail pulls the mean toward it causing the mean to be lower than the center of the data. Left-skewed data will cause the UCL to be low-biased; making it more likely to show the tank is clean when, in fact, the concentration of that analyte exceeds the AL. The normal-quantile plot is a plot that is used to determine if the data follow a normal distribution. If the data follow a normal distribution then the points on the graph will lie along a straight line. Any deviations from a straight line are indicative of deviations from normality. If the tails bend away from the line at only one end of the line, then the data are asymmetric. If the data veer away from the line at both ends, then the tails of the distribution are either too heavy or too light to assume a normal distribution. It is important to note that no real world data set is perfectly normal so a certain amount of deviation from the line is to be expected, even in data that are sufficiently normal to perform the desired analysis.

The following sections provide an overall analysis of the data pertaining to the samples collected from the post-decontamination tank contents. Because decontamination activities reduced the volume of solids remaining in the tank to less than 15% by volume of the total sample collected, the solids portion of the samples collected were not analyzed and compared with the ALs for regulated constituents. Samples taken from Tank WM-184 were analyzed for inorganic, organic, and radionuclide constituents. Each analysis type is discussed separately in Sections 7.1–7.5. The impact of laboratory performance on the data quality is discussed, and detected analytes are examined statistically.

4. STATISTICAL TEST SELECTION

Once the preliminary data review has been completed, an appropriate statistical hypothesis test may be selected to answer the question(s) for which the data were collected. The data are analyzed to determine whether the data meet the assumptions of the desired test(s).

One of the primary requirements of many hypothesis tests is that the sample mean has a normal distribution. Tests that require the assumption of normality are generally more efficient than either non-parametric tests (i.e., tests that do not require the data to follow a specific distribution). That is, a test that requires the sample mean to have a normal distribution can provide more accurate and reliable answers with fewer data points than a test that does not require the data to conform to a specific distribution. If the data have a normal distribution, then the sample mean will also have a normal distribution. Data not demonstrating a normal distribution can be transformed and used if the transformed data are normally distributed. However, if the data do not have a normal distribution and cannot be transformed to achieve normality, the sample mean may still have a normal distribution. The Central-Limit Theorem states that the distribution of the sample mean will be normal, regardless of the distribution of the data, if the sample size is sufficiently large. The more the data deviate from the normal distribution, the larger the sample size must be to ensure that the distribution of the sample mean is normal. Bootstrapping is a simulation technique that can be used to assess the distribution of the sample mean. If data are not normal in distribution and normality cannot be achieved through transformation, bootstrapping will be used to assess the distribution of the sample mean.

Non-parametric tests are most appropriate if the sample mean does not follow a normal distribution and an appropriate transformation cannot be found. Although they do not require the data to exhibit a normal distribution, most non-parametric hypothesis tests also have assumptions that must be met. One of the most common assumptions for one-sample non-parametric tests is that the data have a symmetric distribution. The assumptions of a selected hypothesis test, whether parametric or non-parametric, must be verified before the test is performed on the data.

The primary questions to be answered in relation to the post-decontamination contents of Tank WM-184 are:

- Does the mean concentration of any constituent of concern exceed the specified AL or radionuclide inventory?
- Do the data support the assumptions of variance (standard deviation squared) and normal distribution?

The appropriate test to answer the first question compares the sample mean to a constituent-specific AL. Three primary tests are appropriate for answering this type of question: the one-sample *z*-test, the Student's one-sample *t*-test, and the Wilcoxon signed rank test.

The *z*-test requires: (a) knowledge of the population standard deviation (σ) and (b) that the sample mean follows a normal distribution. Because the population standard deviation for each constituent concentration in the post-decontamination contents of Tank WM-184 is not known, the *z*-test will not be considered further. The *t*-test allows the use of the sample standard deviation (s), which is an estimate of σ . The *t*-test also requires that the sample mean follows an approximate normal distribution. It is important to note that if the data follow a normal distribution, the sample mean will also have a normal distribution (as proven by a mathematical theorem). However, if the data do not follow a normal distribution, the sample mean will still follow a normal distribution if the sample size is sufficiently large (as shown by the Central-Limit Theorem). The Wilcoxon signed rank test is a non-parametric test that

compares a sample mean to an AL but does not require the data to follow a normal distribution. The primary assumption for this test is that the data are symmetric. If the data are analyzed and found to be neither normally distributed nor symmetric, the data may be transformed. Data are transformed by performing the same operation on each data point (such as taking the natural logarithm of each observation). If the transformed data have a normal distribution or are symmetric, then the appropriate test can be performed on the transformed data. If the UCL of an analyte for which the data has been transformed is desired, it can be calculated using the transformed data. The AL can then be transformed using the same function and directly compared to the UCL within the transformed space. If an appropriate transformation cannot be found to achieve normality in the data, bootstrapping will be done to determine if the sample mean follows a normal distribution despite the non-normality of the data. If data are neither normal nor symmetric in distribution, bootstrapping will be performed to generate a 95% UCL for the analyte.

Because the *t*-test allows use of the sample standard deviation (*s*) and is a very powerful test for small data sets, the *t*-test was chosen as the most desirable means for testing the null hypothesis. After selecting a statistical test, it is necessary to verify the assumptions of the test selected. These assumptions are examined in Section 5.

5. VERIFICATION OF THE ASSUMPTIONS FOR THE SELECTED HYPOTHESIS TEST

This section examines the underlying assumptions of the statistical hypothesis test in light of the data collected. Both parametric and non-parametric tests require the samples to be independent of each other, and this assumption should be verified. In addition, to select the appropriate test, the distributions of the data obtained for each analyte need to be evaluated. Parametric tests, which require the sample mean to be normally distributed, can provide more accurate and reliable answers with fewer data points than non-parametric tests and, therefore, are the preferred tests. Also, if the data have a normal distribution, the sample mean will also follow a normal distribution. Consequently, it must first be determined if the data follow a normal distribution or if they can be transformed to follow a normal distribution. This is done using graphical methods such as histograms and normal-quantile plots. Statistical tests such as the Shapiro-Wilk W test or the χ^2 test for distributions can be used to determine if the data follow a normal distribution, but they have their limitations. If the data set is large, even data that are very close to normal in distribution may not pass the test. If the data set contains a small number of data points, it can be difficult for distributional tests to detect deviations from normality in the data. However, the standard deviations for analytes in Tank WM-184 are small compared to the ALs, and the observed concentrations are less than the ALs to such a degree that five samples are adequate for confidently declaring Tank WM-184 sufficiently clean for closure.

If the data are not normal in distribution and cannot be transformed to achieve normality, bootstrapping will be performed on the data to determine if the sample mean still follows a normal distribution. Bootstrapping is a technique in the family of Monte Carlo methods that resample the observed data to obtain more information about the population. In the case of the rinsate data, the observed data for the analyte in question will be sampled, with replacement, five times. A sample mean will then be computed from this “new” data set. This process will be repeated 1,000 times to obtain 1,000 sample means. The sample means will then be plotted using a histogram and a normal-quantile plot to determine if the sample means follow a normal distribution. If the sample mean appears to be normal, the data meet the normality requirements for the *t*-test. For further details on bootstrapping see *An Introduction to the Bootstrap* (Efron and Tibshirani 1994).

In the analysis of the Tank WM-184 rinsate data, graphical methods and the Shapiro-Wilk W test were used to assess normality. Boxplots and normal-quantile plots of the data were prepared using S-Plus 2000 (Insightful Corporation 2000) software. Analyse-It software (Analyse-It 2003) was used to perform the Shapiro-Wilk W test calculations. Because only five samples were taken from the tank, histograms were not very informative. Normal-quantile plots were the primary graphical method used to evaluate whether the data exhibit a normal distribution. These plots are presented in Appendixes A–E of this report. The assessment of normality of the data is discussed in the following sections.

Since the primary objective of this statistical analysis is to determine if the mean concentration of a specified analyte is less than its associated AL, the following criteria have been developed in dealing with deviations from normality:

- If the Shapiro-Wilk W test indicates that the data are normally distributed at the $\alpha = 0.05$ level and the summary statistics and plots indicate that the data are symmetric, then the *t*-test will be performed on the raw data.
- If the Shapiro-Wilk W test conclusively shows that the data are normally distributed (the *p*-value is comfortably greater than 0.05), but the boxplot and other summary statistics indicate that the data might be right-skewed, then the raw data will be used for the *t*-test. However, if the data in this

situation fail the *t*-test, a transformation that can make the data closer to normal in distribution will be sought and the test will be redone.

- If the *p*-value for the Shapiro-Wilk W test is close to or less than 0.05 and the data are left-skewed, then a transformation will be sought to bring the distribution into the acceptable range of normality.
- If the data are right-skewed and the *p*-value for the Shapiro-Wilk W test is less than 0.05, indicating that the data are non-normal, then an appropriate transformation will be sought for the data.
- If an appropriate transformation cannot be found then bootstrapping will be performed on the data to generate a non-parametric 95% UCL for comparison with the AL.

The results of the Shapiro-Wilk W test are reported for all of the reported results as well as for any successful transformations in Sections 7.1–7.5. Results for unsuccessful transformations are not reported because many transformations were attempted for each analyte that exhibited non-normality. It is also important to note that the Wilcoxon signed rank test will not be considered for data that exhibited non-normality and asymmetry because symmetry is a basic assumption of the test. It is possible to determine how the type of asymmetry will affect a *t*-test, but it is not as clear how asymmetry will affect the results of the Wilcoxon signed rank test.

5.1 Verification of Standard Deviation Assumption

The SAP associated with this project assumed a standard deviation of 10% of the AL to estimate the sample size necessary to achieve the desired α and β . The ratio (standard deviation)/(AL) was measured for each detected analyte. Mercury had the highest calculated percentage (8.82%). This implies that the standard deviation assumption was met for each of the other analytes and the chosen levels of α and β were, in fact, conservative estimates of true levels of α and β achieved using the data sets for this analysis.

Table 1 provides the complete list of standard deviation to AL comparisons for detected metals, anions, and organic analytes. Analytes for which no AL exists were excluded from the table. Likewise, Table 2 provides the comparison of standard deviation to PA modeled inventory values for detected radionuclides.

5.2 Verification of Independence Between Risers

One of the primary assumptions for performing the *t*-test is that the samples are independent from one another. The sampling method ensured that the samples retrieved from each of the risers were independent of the riser from which they were taken. The contents of the tank were thoroughly mixed and then one sample was taken from each of the risers. Then the contents of the tank were thoroughly agitated again and a sample was taken from each of two randomly selected risers. Since the rinsate came in contact with all surfaces of the tank during agitation and sampling was completed quickly after agitation, each sample had equal chance of being selected regardless of which riser it was collected from. Therefore, it can be assumed that the sample was truly a simple random sample and that the samples were indeed independent from one another and the location from which they were collected.

Table 1. Summary of comparison of standard deviation to action level for detected organic and inorganic analytes.

Analyte	Standard Deviation ($\mu\text{g/L}$)	Action Level ($\mu\text{g/L}$)	Percentage
Metals			
Aluminum	422	3,100,000	0.01%
Cadmium	0.82	610	0.13%
Chromium	8.80	900	0.98%
Cobalt	0.47	770,000	0.00%
Copper	4.04	600,000	0.00%
Iron	531	1,700,000	0.03%
Lead	4.45	4,000	0.11%
Manganese	10.7	490,000	0.00%
Mercury	14.1	160	8.82%
Nickel	6.75	440,000	0.00%
Silver	66.2	3,000	2.21%
Anions			
Fluoride	0.26	770	0.03%
Organics			
Phenol	0.43	2,400,000	0.00%
2,4-dinitrophenol	2.35	140,000	0.00%

Table 2. Summary of comparison of standard deviation to inventory value for detected radionuclides.

Analyte	Standard Deviation (pCi/L)	Inventory Level (pCi/L)	Percentage
Radionuclides			
^{241}Am	7.61E+03	3.60E+07	0.02%
^{60}Co	2.76E+03	1.40E+07	0.02%
^{134}Cs	3.87E+03	1.21E+06	0.32%
^{137}Cs	7.62E+06	1.15E+11	0.01%
^{154}Eu	9.38E+03	1.83E+08	0.01%
^3H	4.87E+02	1.61E+07	0.00%
^{129}I	1.03E+01	7.44E+04	0.01%
^{94}Nb	1.01E+04	3.44E+06	0.29%
^{63}Ni	6.09E+02	8.70E+07	0.00%
^{237}Np	6.70E+02	3.43E+05	0.20%
^{238}Pu	1.73E+06	5.70E+08	0.30%
$^{239/240}\text{Pu}$	3.52E+05	7.05E+07	0.50%
^{241}Pu	2.56E+06	4.24E+08	0.60%
^{125}Sb	5.16E+04	1.49E+06	3.46%
^{99}Tc	2.04E+02	2.99E+07	0.00%
Total Sr (^{90}Sr)	2.92E+05	8.15E+10	0.00%
^{234}U	9.14E+01	2.52E+06	0.00%

6. IMPLEMENTATION OF THE STATISTICAL TEST

If the preliminary data analysis and the evaluation of test assumptions indicate that the *t*-test may be appropriately applied to determine if the mean concentration of any constituent of concern exceeds its specified AL, then the test will be applied to the data. The review of the data relative to distributional assumptions will be performed in Sections 7.1–7.5 and will show that the assumption was adequately met for all data except as noted.

The one-sample *t*-test is the statistical hypothesis test that was selected for use on the observed data (provided the assumptions of the test are met). This test compares the sample mean with the AL to determine the likelihood that the population mean exceeds the AL. This test can be implemented in several ways. The traditional method is to compute a *t*-statistic from the observed data and the AL and then use it to determine the appropriate *p*-value. The *p*-value reflects the probability that a sample mean as small, or smaller, than the one observed will be seen if the tank is contaminated. Therefore, the smaller the *p*-value is, the less likely it is that the contamination in the tank exceeds the AL. Another way to run the *t*-test is to compare the UCL to the AL. If the UCL is less than the AL then it can be concluded that tank is sufficiently clean. The UCL comparison is the method that was used in this document.

The UCL of the sample mean is calculated using Equation (6):

$$UCL = \bar{x} + t_{1-\alpha, df}^* \frac{s}{\sqrt{n}} \quad (6)$$

where

\bar{x} = sample mean.

$t_{1-\alpha, df}^*$ = *t*-statistic for the confidence level, $(1 - \alpha)*100\%$, and degree of freedom, *df*. In this case, the confidence is $(1 - 0.05)*100\% = 95\%$ and the *dfs* are $n - 1 = 4$. From statistical tables, this corresponds to a value of 2.132 (or 2.776 for pH as explained below).

s = sample standard deviation.

n = number of samples taken.

The 95% LCL is also of importance to analyzing the pH. Because the pH has ALs for both high pH and low pH, it is necessary to determine if the pH is less than the LCL. Because both the LCL and the UCL are important, the *t*-value for the LCL and UCL will be determined with $\alpha/2$ instead of α to ensure that the total probability of a false-positive decision error occurring is α rather than $2*\alpha$. The LCL is compared to a pH of 2 to ensure that the true mean is greater than 2 at the specified degree of confidence. The LCL is calculated using Equation (7):

$$LCL = \bar{x} - t_{1-\alpha/2, df}^* \frac{s}{\sqrt{n}} \quad (7)$$

where

\bar{x} = sample mean.

$t_{1-\alpha/2, df}^*$ = t -statistic for degree of confidence, $(1 - \alpha)*100\%$, and degree of freedom, df . In this case, the confidence is $(1 - 0.05)*100\% = 95\%$ and the df 's are $n - 1 = 4$. Because the LCL and the UCL are being compared with the AL, $\alpha/2 = 0.025$ is used to determine the appropriate t -value. From statistical tables, this corresponds to a value of 2.776.

s = sample standard deviation.

n = number of samples taken.

The UCLs and ALs are used to implement the t -test. Decisions about whether or not the ALs may have been exceeded for each of the detected organic and inorganic constituents will be presented in Sections 7.1–7.3. The LCL will also be presented for pH to ensure that neither AL was exceeded. The results for pH are included in Section 7.4.

If the data are not normal in distribution then bootstrapping will be used to compute a 95% UCL for the data. Bootstrapping is a technique in the family of Monte Carlo methods that resample the observed data to obtain more information about the population. In the case of the rinsate data, the observed data for the analyte in question will be sampled, with replacement, five times. A sample mean will then be computed from this “new” data set. This process will be repeated 1,000 times to obtain 1,000 sample means. The 95% UCL of the data is the 95th percentile of the 1,000 sample means generated by the bootstrap method. This UCL can be directly compared to the action or inventory level to perform the appropriate statistical test. For further details on bootstrapping see *An Introduction to the Bootstrap* (Efron and Tibshirani 1994).

No specific regulatory thresholds relative to the activity (i.e., concentrations) exist for the radionuclides left in any one tank after decontamination. Rather, the total inventory of radionuclides remaining in all closed components of the TFF will be evaluated following completion of the TFF decontamination efforts. The PA (DOE-ID 2003) conducted to address the DOE Order 435.1 (2001) closure requirements provide an estimate of acceptable radionuclide concentrations in the liquids remaining in each tank following decontamination. While these modeled levels are not the basis for a decision such as continuing to clean a tank, the modeled values required to meet DOE closure standards can be compared with the levels achieved through decontamination efforts. Because of this, hypothesis testing is not required to make decisions concerning whether decontamination of Tank WM-184 may cease; however, hypothesis testing using the modeled value as the AL provides information on the decontamination effort for the radionuclides. Section 7.5 provides the UCLs for radionuclides and compares them with the PA modeled inventory (DOE-ID 2003).

7. NUMERICAL RESULTS OF DATA ANALYSIS

This section provides the results for the preliminary data analysis, verification of test assumptions, and the test results for each of the constituents and radionuclides of concern. Each type of analyte will be presented in its own section for ease of reference.

7.1 Data Assessment for Metals

This section will provide all of the preliminary data analysis, normality verification, and test results for the metals detected in the tank residuals. Data generated from these analyses were validated in accordance with technical procedures, and data validation flags were assigned to results based on laboratory performance on associated quality control analyses. The metals data were of high quality, and no significant quality control issues were identified in validation (Portage Environmental, Inc. 2004a). Metals with reported concentrations that were comparable to levels in the associated blanks were assigned a “U”-flag (undetected). Percent recovery results for silver were slightly below the acceptance criteria for the matrix spike/matrix spike duplicate analyses. Reported results for silver were assigned a “J” validation flag accordingly.

Table 3 lists the metals that were detected in the tank residuals. Lead was detected in only three of the five samples. The preliminary data analysis will be performed for lead, but a UCL will not be calculated due to insufficient data. The largest result reported for lead was 12.8 µg/L, and the corresponding AL is 4,000 µg/L. Therefore, from a regulatory perspective, closure requirements have been met with respect to lead. Metals that were not detected in tank residuals are not discussed in this document.

Table 3. Metals detected in the Tank WM-184 liquid residuals.

Detected Metals		
Aluminum	Iron	Molybdenum
Cadmium	Lead ^a	Nickel
Chromium	Magnesium	Potassium
Cobalt	Manganese	Silver
Copper	Mercury	Sodium

a. This analyte was only detected in three of the five samples.

7.1.1 Preliminary Data Analysis for Metals Data

The preliminary data analysis consists of several statistical quantities of interest and the five-number summary for the metals. In Table 4, the measures of central tendency and spread for metals are listed. Table 5 provides the five-number summary for each of the detected analytes. Boxplots and normal-quantile plots for metals are shown in Appendix A. Numerical and graphical summaries indicate that nickel may be right-skewed. The distribution of nickel will be discussed further in the next section. Laboratory results and associated validation flags for metals data presented in this DQA are listed in Appendix F.

Table 4. Summary statistics of central tendency and spread for metals detected in the Tank WM-184 liquid residuals.

Analyte	Mean ($\mu\text{g/L}$)	Median ($\mu\text{g/L}$)	Standard Deviation ($\mu\text{g/L}$)	Coefficient of Variation (%)	Interquartile Range ($\mu\text{g/L}$)	Range ($\mu\text{g/L}$)
Aluminum	3,010	3,060	422	14.02	390	1,120
Cadmium	5.4	5.5	0.82	15.29	0.60	2.2
Chromium	28.5	25.2	8.80	30.89	5.10	23.0
Cobalt	1.6	1.4	0.47	29.32	0.80	1.0
Copper	11.3	11.4	4.04	35.89	4.20	10.3
Iron	1,163	1,090	531	45.67	800	1,235
Lead	7.58	5.80	4.45	58.70	8.20	9.10
Magnesium	46.6	44.2	4.93	10.57	7.90	10.8
Manganese	69.8	71.5	10.7	15.34	14.1	26.5
Mercury	80.0	79.6	14.1	17.65	6.80	38.6
Molybdenum	9.90	8.90	3.68	37.17	4.60	8.80
Nickel	24.3	21.8	6.75	27.78	2.90	17.4
Potassium	588	591	96.6	16.44	105	248
Silver	227	216	66.2	29.13	99.0	158
Sodium	5,764	6,080	941	16.32	1,090	2,370

Table 5. Five-number summary of metals detected in the Tank WM-184 liquid residuals.

Analyte	Minimum Value ($\mu\text{g/L}$)	First Quartile ($\mu\text{g/L}$)	Median ($\mu\text{g/L}$)	Third Quartile ($\mu\text{g/L}$)	Maximum Value ($\mu\text{g/L}$)
Aluminum	2,400	2,840	3,060	3,230	3,520
Cadmium	4.1	5.2	5.5	5.8	6.3
Chromium	20.0	24.6	25.2	29.7	43.0
Cobalt	1.2	1.2	1.4	2.0	2.2
Copper	7.00	8.20	11.4	12.4	17.3
Iron	465	880	1,090	1,680	1,700
Lead	3.70	3.70	5.80	11.9	12.8
Magnesium	41.6	43.5	44.2	51.4	52.4
Manganese	55.1	63.3	71.5	77.4	81.6
Mercury	63.4	74.0	79.6	80.8	102
Molybdenum	4.80	8.80	8.90	13.4	13.6
Nickel	18.4	21.3	21.8	24.2	35.8
Potassium	479	518	591	623	727
Silver	150	182	216	281	308
Sodium	4,560	5,080	6,080	6,170	6,930

7.1.2 Normality of the Metals Data

Detected metals data were also analyzed using normal-quantile plots and the Shapiro-Wilk W test. Normal-quantile plots and the Shapiro-Wilk W test show that all of the metals are sufficiently normal in distribution to warrant use of the *t*-test. The preliminary data analysis indicated that nickel may be right-skewed, but it appears that the degree of asymmetry is not very pronounced.

The Shapiro-Wilk W test was done on the untransformed data. Table 6 contains the results of the Shapiro-Wilk W test for the detected metals constituents. Because the calculated *p*-values for all metals are considerably greater than 0.05, the underlying data set exhibits a normal distribution for metals constituents. Therefore, a *t*-test will be used on the untransformed data of the detected metals.

Table 6. Results of the Shapiro-Wilk W test for metals constituents.

Analyte	Test Statistic	<i>p</i> -value	Are Data Normal?
Aluminum	0.9875	0.9704	Yes
Cadmium	0.9537	0.7633	Yes
Chromium	0.8800	0.3093	Yes
Cobalt	0.8360	0.1542	Yes
Copper	0.9458	0.7071	Yes
Iron	0.9111	0.4745	Yes
Magnesium	0.8504	0.1959	Yes
Manganese	0.9639	0.8347	Yes
Mercury	0.9356	0.6352	Yes
Molybdenum	0.8942	0.3786	Yes
Nickel	0.8250	0.1276	Yes
Potassium	0.9687	0.8667	Yes
Silver	0.9468	0.7142	Yes
Sodium	0.9541	0.7666	Yes

7.1.3 Implementation of the Statistical Test

Results from the previous sections indicate that the *t*-test is appropriate for use on the metals data. Table 7 lists the UCLs and ALs for each of the metals detected in tank residuals.

Table 7. Summary of post-decontamination concentrations of metal constituents detected in the rinsate of Tank WM-184.

Constituent	Mean Concentration	95% UCL	Units	Action Level	Action Level Exceeded?
Aluminum	3,010	3,412	µg/L	3,100,000	No
Cadmium	5.38	6.16	µg/L	610	No
Chromium	28.5	36.9	µg/L	900	No
Cobalt	1.6	2.0	µg/L	770,000	No
Copper	11.3	15.1	µg/L	600,000	No
Iron	1,163	1,669	µg/L	1,700,000	No

Table 7. (continued).

Constituent	Mean Concentration	95% UCL	Units	Action Level	Action Level Exceeded?
Magnesium	46.6	51.3	µg/L	NA	NA
Manganese	69.8	80.0	µg/L	490,000	No
Mercury	80.0	93.4	µg/L	160	No
Molybdenum	9.90	13.4	µg/L	NA	NA
Nickel	24.3	30.7	µg/L	440,000	No
Potassium	588	680	µg/L	NA	NA
Silver	227	291	µg/L	3,000	No
Sodium	5,764	6,661	µg/L	NA	NA

NA = Not applicable. Analyte is not a constituent of concern with a corresponding AL.

It can be seen from the results in Table 7 that none of the metals have exceeded their specified ALs. Therefore, decontamination of Tank WM-184 has been successful with respect to metal constituents of concern.

7.2 Data Assessment for Anions

This section provides all of the preliminary data results, normality verification, and test results for anions detected in the tank residuals. Data generated from these analyses were validated in accordance with technical procedures. Data validation flags were assigned to results based on laboratory performance on associated quality control analyses. The results reported for fluoride were qualified “J” (estimated) to denote a potential low bias reflected in slightly low percent recovery results from the analytical spike (Portage Environmental, Inc. 2004b). Based on acceptable results for the other quality control analyses, the impact to data usability is negligible.

Table 8 presents a list of anions detected in the tank residuals and discussed in the next section. Phosphate was detected in only two of the five samples; therefore, insufficient data exist to perform formal statistical analysis on this anion. Because phosphate does not have an associated AL, this should not pose a problem from a closure perspective. Phosphate will not be discussed further in this document.

Table 8. Anions detected in the Tank WM-184 liquid residuals.

Detected Anions		
Chloride	Nitrate	Sulfate
Fluoride	Phosphate ^a	

a. Analyte was detected in only two of the five samples.

7.2.1 Preliminary Data Analysis for Anions

Table 9 presents the measures of central tendency and spread for anions. Table 10 provides the five-number summary for each of the detected anions. Boxplots and normal quantile plots for anions are shown in Appendix B. Laboratory results and associated validation flags for anions data presented in this DQA are listed in Appendix G.

Table 9. Summary statistics of central tendency and spread for anions detected in the Tank WM-184 liquid residuals.

Analyte	Units	Mean	Median	Standard Deviation	Coefficient of Variation (%)	Interquartile Range	Range
Chloride	mg/L	2.72	2.77	0.233	8.57	0.110	0.640
Fluoride	mg/L	0.60	0.50	0.26	43.23	0.28	0.64
Nitrate	mg-N/L	10.6	11.4	1.74	16.47	2.44	4.07
Sulfate	mg/L	1.42	1.55	0.237	16.70	0.410	0.490

Table 10. Five-number summary for anions detected in the Tank WM-184 liquid residuals.

Analyte	Units	Minimum Value	First Quartile	Median	Third Quartile	Maximum Value
Chloride	mg/L	2.36	2.67	2.77	2.78	3.00
Fluoride	mg/L	0.35	0.43	0.50	0.71	0.99
Nitrate	mg-N/L	8.43	9.06	11.4	11.5	12.5
Sulfate	mg/L	1.16	1.17	1.55	1.58	1.65

Preliminary analysis of the anion data indicates that the data are symmetric in distribution with no outliers. The symmetry of the data will be addressed in the following section.

7.2.2 Normality of the Anions Data

Detected anions were analyzed using normal-quantile plots and the Shapiro-Wilk W test. Table 11 contains the results of the Shapiro-Wilk W test for the anions data. The Shapiro-Wilk W test indicates that the data are sufficiently normal in distribution for use of the *t*-test.

Table 11. Results of the Shapiro-Wilk W test for anions.

Analyte	Test Statistic	p-value	Are Data Normal?
Chloride	0.9432	0.6889	Yes
Fluoride	0.9152	0.4994	Yes
Nitrate	0.8939	0.3772	Yes
Sulfate	0.7997	0.0805	Yes

7.2.3 Implementation of the Statistical Test

Results from the previous sections indicate that the *t*-test is appropriate for use on the anions data. Table 12 lists the UCLs and ALs for each of the anions detected in tank residuals.

Table 12. Summary of post-decontamination concentrations of anion constituents detected in the rinsate of Tank WM-184.

Constituent	Mean Concentration	95% UCL	Units	Action Level	Action Level Exceeded?
Chloride	2.72	2.94	mg/L	NA	NA
Fluoride	0.60	0.84	mg/L	770	No
Nitrate	10.6	12.2	mg-N/L	NA	NA
Sulfate	1.42	1.65	mg/L	NA	NA

NA = Analyte is not a constituent of concern with a corresponding AL.

Results presented in Table 12 indicate that none of the anions have exceeded their ALs. Therefore, it can be concluded that decontamination efforts with respect to anions in Tank WM-184 have been successful.

7.3 Data Assessment of Organics

Samples collected from Tank WM-184 were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Data generated from these analyses were validated in accordance with technical procedures, and data validation flags were assigned to results based on laboratory performance on associated quality control analyses. During validation of the VOCs, the undetected results reported for cyclohexanone were assigned the validation flag “R” (rejected) based on a low response factor in a continuing calibration (Environmental Validation & Assessment Consultants 2004a). In spite of the low response factor, the compound was detected in the continuing calibration. Furthermore, if cyclohexanone had been present at levels near the corresponding action limit, a positive detection would have been made in spite of the low response factor noted. Therefore, the impact to data usability was considered to be minimal. The results from all other quality control analyses associated with the VOC analyses were acceptable (Environmental Validation & Assessment Consultants 2004a and 2004b). During validation of the SVOC data, minor quality control issues were noted, and the results are flagged accordingly (Environmental Validation & Assessment Consultants 2004c). The data usability was not negatively impacted based on the items noted. No quality control issues were identified during the validation of the PCB data (Environmental Validation & Assessment Consultants 2004d).

Most of the organic constituents of concern were not detected in the post-decontamination tank contents. Table 13 lists the organic compounds that were detected in the tank residuals. Pentachlorophenol was detected in only one of the five samples at a concentration of 3.2 µg/L. This compound has no AL associated with it. Because only one detection was made, insufficient data exist to perform meaningful statistical analysis for this compound, and it will not be discussed further in this document. Laboratory results and associated validation flags for organics data presented in this DQA are listed in Appendix H.

7.3.1 Preliminary Data Analysis for Organic Constituents

The measures of central tendency and spread and the five-number summary for organic constituents are presented in Tables 14 and 15, respectively. Boxplots and normal quantile plots can be seen in Appendix D. The data indicate that 2,4-dinitrophenol may be right-skewed. The distributional assumption will be further investigated in the following section.

Table 13. Organic compounds detected in the Tank WM-184 liquid residuals.

Detected Volatile Organic Compounds		
None		
Detected Semivolatiles		
2,4-Dinitrophenol	Phenol	Tributyl phosphate
Pentachlorophenol ^a		

a. Analyte was detected in only one sample. Insufficient data exist to perform statistical analysis for this analyte.

Table 14. Summary statistics of central tendency and spread for organic compounds detected in the Tank WM-184 liquid residuals.

Analyte	Mean ($\mu\text{g/L}$)	Median ($\mu\text{g/L}$)	Standard Deviation ($\mu\text{g/L}$)	Coefficient of Variation (%)	Interquartile Range ($\mu\text{g/L}$)	Range ($\mu\text{g/L}$)
Phenol	3.2	3.1	0.43	13.72	0.70	1.0
2,4-dinitrophenol	16.8	16.1	2.35	13.95	0.400	5.70
Tri-n-butyl phosphate	871	871	77.7	8.92	89.0	196

Table 15. Five-number summary for organic compounds detected in the Tank WM-184 liquid residuals.

Analyte	Minimum Value ($\mu\text{g/L}$)	First Quartile ($\mu\text{g/L}$)	Median ($\mu\text{g/L}$)	Third Quartile ($\mu\text{g/L}$)	Maximum Value ($\mu\text{g/L}$)
Phenol	2.7	2.8	3.1	3.5	3.7
2,4-dinitrophenol	15.3	15.7	16.1	16.1	21.0
Tri-n-butyl phosphate	789	811	871	900	985

7.3.2 Normality of Organic Data

A normal-quantile plot was constructed and the Shapiro-Wilk W test was performed for each of the organic compounds with a sufficient number of detects. The results indicate that 2,4-dinitrophenol is not normal in distribution. This is likely due to the fact that two of the values for 2,4-dinitrophenol are identical. Transformations were attempted to achieve normal data, but a successful transformation was not found. Bootstrapping was performed to assess the distribution of the sample mean. Results indicate that the sample mean does not follow a normal distribution. Therefore, bootstrapping will be used to compute the appropriate 95% UCL for 2,4-dinitrophenol. The normality assumption was sufficiently met for both phenol and tri-n-butyl phosphate. Table 16 lists the results for the Shapiro-Wilk W test.

7.3.3 Implementation of the Statistical Test

Results from the previous sections indicate that the *t*-test is appropriate for use on the organic data, with the exception of 2,4-dinitrophenol. The UCL for 2,4-dinitrophenol is calculated using the bootstrap method instead of the *t*-statistic. Table 17 lists the UCLs and ALs for each of the anions detected in tank residuals.

Table 16. Results of the Shapiro-Wilk W test for organic constituents.

Analyte	Test Statistic	p-value	Are Data Normal?
Phenol	0.9240	0.5563	Yes
2,4-dinitrophenol	0.6838	0.0064	No
Tri-n-butyl phosphate	0.9531	0.7595	Yes

Table 17. Summary of post-decontamination concentrations of organic constituents detected in the rinsate of Tank WM-184.

Constituent	Mean Concentration	95% UCL	Units	Action Level	Action Level Exceeded?
Phenol	3.16	3.57	µg/L	2,400,000	No
2,4-dinitrophenol	17	19 ^a	µg/L	140,000	No
Tri-n-butyl phosphate	871	945	µg/L	NA	NA

NA =Not Applicable. Analyte is not a constituent of concern with a corresponding AL.

a. UCL was generated using the bootstrap method.

It can be seen from the test results that none of the organics constituents has exceeded the associated ALs. Therefore, decontamination goals with respect to organic constituents of concern have been achieved.

7.4 Data Assessment for pH

The pH of the samples collected from the Tank WM-184 post-decontamination residuals was also measured. The data for pH were validated according to technical procedures, and no issues with any applicable quality control criteria were identified (Portage Environmental, Inc. 2004b). This section contains the preliminary data analysis, test assumption verification, and the implementation of the statistical test for pH.

7.4.1 Preliminary Data Analysis

Tables 18 and 19 list the summary statistics calculated for pH. The associated boxplot and normal-quantile plot can be found in Appendix C. Laboratory results and associated validation flags for pH data presented in this DQA are listed in Appendix G.

Table 18. Summary statistics of central tendency and spread for pH detected in the Tank WM-184 liquid residuals.

Analyte	Mean	Median	Standard Deviation	Coefficient of Variation (%)	Interquartile Range	Range
pH	3.52	3.5	0.045	1.27	0.00	0.10

Table 19. Five-number summary for pH detected in the Tank WM-184 liquid residuals.

Analyte	Minimum Value	First Quartile	Median	Third Quartile	Maximum Value
pH	3.5	3.5	3.5	3.5	3.6

The preliminary data analysis indicates that the pH data is extremely right-skewed. This is because four of the five data points are identical. Therefore, it is unlikely that the *t*-test will be appropriate for use on these data.

7.4.2 Normality of the pH Data

Normality was also assessed for the pH data. The normal-quantile plot showed that the data are far from normal in distribution. The Shapiro-Wilk W test results are included in Table 20. This means that the assumptions for the *t*-test have not been met and the UCL will be computed using the bootstrap method.

Table 20. Results of the Shapiro-Wilk W test for pH.

Analyte	Test Statistic	<i>p</i> -value	Are Data Normal?
pH	0.5522	0.0001	No

7.4.3 Implementation of the Statistical Test

Results from the previous sections indicate that the *t*-test is not appropriate for use on the pH data. The UCL and LCL were both calculated using the bootstrap method because the sample mean did not follow a normal distribution and could not be transformed to do so. Table 21 lists the LCL, UCL, and the AL for pH detected in tank residuals.

Table 21. Summary of post-decontamination pH in the rinsate of Tank WM-184.

Constituent	Mean Concentration	95% LCL	95% UCL	Lower Action Level	Upper Action Level	Action Level Exceeded?
pH	3.52	3.50 ^a	3.56 ^a	2.0	12.5	No

a. The UCL and LCL were computed using the bootstrap method.

It can be seen from Table 21 that the ALs have not been exceeded. Therefore, decontamination goals with respect to pH have been met for Tank WM-184.

7.5 Data Assessment for Radionuclides

Samples collected from Tank WM-184 for analysis of radionuclides provided analytical data that are generally of high quality. The data generated were validated according to technical procedures and validation flags were assigned based on laboratory performance on quality control analyses (Portage Environmental, Inc. 2004c, 2004d, 2004e, 2004f). Total strontium was determined as ⁹⁰Sr. All isotopes of strontium other than ⁹⁰Sr are short-lived and would not be present in the tank residuals. Therefore, total strontium and ⁹⁰Sr are the same and used interchangeably throughout this document. The data for ⁹⁹Tc were generated by inductively coupled plasma-mass spectrometry (ICP-MS). Table 22 lists radionuclides that were detected in the tank residuals.

Table 22. Radionuclides detected in the Tank WM-184 liquid residuals.

Detected Radionuclides		
$^{108m}\text{Ag}^{\text{a}}$	^3H	$^{239/240}\text{Pu}$
^{241}Am	^{129}I	^{241}Pu
^{60}Co	^{94}Nb	$^{103}\text{Ru}^{\text{a}}$
^{134}Cs	$^{95}\text{Nb}^{\text{a}}$	^{125}Sb
^{137}Cs	^{63}Ni	$^{99}\text{Tc ICP-MS}$
^{154}Eu	^{237}Np	Total Sr (^{90}Sr)
$^{155}\text{Eu}^{\text{b}}$	^{238}Pu	^{234}U

a. This analyte was detected in only one of the five samples. Because only one detection was made, it is not possible to perform statistical analysis of the data set for this analyte.

b. This analyte was detected in only two of the five samples. Therefore, it is not possible to perform statistical analysis of the data set for this analyte.

The radionuclide ^{108m}Ag was reported with a positive detection in only one of the five samples. The reported value for ^{108m}Ag is $2.13\text{E+}03$ pCi/L and the corresponding inventory level is $1.26\text{E+}00$ pCi/L. The reported detection is considered to be suspect because the value is only slightly greater than the corresponding MDA and has a large uncertainty associated with it. Furthermore, a confirmation peak for ^{108m}Ag could not be identified. However, even with an activity at the reported value, ^{108m}Ag is not a significant dose contributor. With only one positive result, insufficient data are available to perform meaningful statistical analysis; therefore, ^{108m}Ag will not be discussed further in this document. HWMA/RCRA standards are not impacted by radionuclides, and this should not pose a problem from a regulatory standpoint for closure of Tank WM-184.

Three of the results reported for ^{155}Eu are below the detection limit; therefore, insufficient information is available for statistical analysis. However, the highest observed value for ^{155}Eu is $4.45\text{E+}03$ pCi/L and the inventory level is $1.83\text{E+}08$ pCi/L. Therefore, it can be seen that ^{155}Eu is satisfactorily less than the inventory level and will not be discussed further in this document.

7.5.1 Preliminary Data Analysis of Radionuclides

Summary statistics were generated for the radionuclide data. Table 23 lists the statistical summary of central tendency and spread for detected radionuclides, and Table 24 provides the five-number summary for each of the detected radionuclides. In cases when a radionuclide was detected in only four samples, one-half of the corresponding minimum detectable activity was used in place of the non-detect for the calculations (EPA 2000a). Laboratory results and associated validation flags for radionuclides data presented in this DQA are listed in Appendix I. Plots used in the preliminary data analysis and for test assumption verification are found in Appendix E.

It can be seen from the tables below and their associated plots that ^{94}Nb , ^{238}Pu , and $^{239/240}\text{Pu}$ are potentially right-skewed. Further discussion of the distribution of the radionuclides will take place in the following section.

7.5.2 Normality of the Radionuclide Data

Detected radionuclide data were also analyzed using normal-quantile plots and the Shapiro-Wilk W test. Based on the results from the Shapiro-Wilk W test, the distribution for ^{94}Nb was sufficiently normal

without a transformation to the data. Normal-quantile plots showed that ^{238}Pu and $^{239/240}\text{Pu}$ are not normal in distribution. Several transformations were attempted with ^{238}Pu , but none were successful. Bootstrapping was performed on both the raw data and on several transformations of the data. None of the plots showed that the sample mean was sufficiently normal in distribution to perform the *t*-test. Therefore, the UCL for ^{238}Pu will be computed using the bootstrap method.

Table 23. Summary statistics of central tendency and spread for radionuclides detected in the Tank WM-184 liquid residuals.

Radionuclide	Mean (pCi/L)	Median (pCi/L)	Standard Deviation (pCi/L)	Coefficient of Variation (%)	Interquartile Range (pCi/L)	Range (pCi/L)
^{241}Am	1.49E+04	1.21E+04	7.61E+03	51.12	6.50E+03	1.90E+04
^{60}Co	7.45E+03	9.02E+03	2.76E+03	37.03	4.60E+03	5.78E+03
^{134}Cs	7.31E+03	6.78E+03	3.87E+03	53.01	4.60E+02	1.07E+04
^{137}Cs	1.73E+07	1.65E+07	7.62E+06	44.16	1.30E+06	2.13E+07
^{154}Eu	2.12E+04	1.88E+04	9.38E+03	44.31	4.20E+03	2.55E+04
^3H	4.56E+03	4.52E+03	4.87E+02	10.68	8.00E+02	1.12E+03
^{129}I	7.15E+01	6.95E+01	1.03E+01	14.43	1.16E+01	2.66E+01
^{94}Nb	1.40E+04	1.08E+04	1.01E+04	72.03	2.90E+03	2.65E+04
^{63}Ni	2.24E+03	1.91E+03	6.09E+02	27.15	7.10E+02	1.46E+03
^{237}Np	1.10E+03	1.06E+03	6.70E+02	60.72	3.94E+02	1.83E+03
^{238}Pu	1.30E+06	5.85E+05	1.73E+06	132.86	1.40E+05	3.99E+06
$^{239/240}\text{Pu}$	2.70E+05	1.27E+05	3.52E+05	130.24	3.30E+04	8.13E+05
^{241}Pu	3.14E+06	2.99E+06	2.56E+06	81.44	2.20E+06	6.85E+06
$^{125}\text{Sb}^{\text{a}}$	6.59E+04	6.98E+04	5.16E+04	78.33	4.81E+04	1.37E+05
^{99}Tc	8.40E+02	7.78E+02	2.04E+02	24.29	2.31E+02	5.18E+02
Total Sr (^{90}Sr)	2.81E+06	2.75E+06	2.92E+05	10.39	4.20E+05	7.00E+05
$^{234}\text{U}^{\text{a}}$	2.47E+02	2.20E+02	9.14E+01	37.05	9.80E+01	2.35E+02

a. Data for this radionuclide contains one observation that was below the detection limit. This value was substituted with 0.5*MDA for all statistics calculated for this analyte.

Table 24. Five-number summary for radionuclides detected in the Tank WM-184 liquid residuals.

Radionuclide	Minimum Value (pCi/L)	First Quartile (pCi/L)	Median (pCi/L)	Third Quartile (pCi/L)	Maximum Value (pCi/L)
²⁴¹ Am	8.28E+03	1.01E+04	1.21E+04	1.66E+04	2.73E+04
⁶⁰ Co	4.05E+03	4.87E+03	9.02E+03	9.47E+03	9.83E+03
¹³⁴ Cs	2.76E+03	6.52E+03	6.78E+03	6.98E+03	1.35E+04
¹³⁷ Cs	7.80E+06	1.58E+07	1.65E+07	1.71E+07	2.91E+07
¹⁵⁴ Eu	1.07E+04	1.80E+04	1.88E+04	2.22E+04	3.62E+04
³ H	4.01E+03	4.17E+03	4.52E+03	4.97E+03	5.13E+03
¹²⁹ I	5.88E+01	6.62E+01	6.95E+01	7.78E+01	8.54E+01
⁹⁴ Nb	4.48E+03	1.03E+04	1.08E+04	1.32E+04	3.10E+04
⁶³ Ni	1.68E+03	1.89E+03	1.91E+03	2.60E+03	3.14E+03
²³⁷ Np	3.14E+02	8.06E+02	1.06E+03	1.20E+03	2.14E+03
²³⁸ Pu	4.10E+05	4.93E+05	5.85E+05	6.33E+05	4.40E+06
^{239/240} Pu	8.64E+04	1.03E+05	1.27E+05	1.36E+05	8.99E+05
²⁴¹ Pu	5.30E+04	1.79E+06	2.99E+06	3.99E+06	6.90E+06
¹²⁵ Sb	2.38E+03 ^a	3.50E+04	6.98E+04	8.31E+04	1.39E+05
⁹⁹ Tc	6.12E+02	7.25E+02	7.78E+02	9.56E+02	1.13E+03
Total Sr (⁹⁰ Sr)	2.51E+06	2.59E+06	2.75E+06	3.01E+06	3.21E+06
²³⁴ U	1.31E+02 ^a	2.09E+02	2.20E+02	3.07E+02	3.66E+02

a. When the analyte was not detected, half the minimum detectable activity was used.

Bootstrapping was also performed on ^{239/240}Pu. Bootstrap results show that the sample mean of the data with the double natural logarithm transformation has a sufficiently normal distribution to warrant use of the *t*-test. The Shapiro-Wilk W test was done on the transformed and untransformed data and results are presented in Table 25. The results of the Shapiro-Wilk W test, the normal-quantile plots, and the bootstrapping analysis indicate it is appropriate to use the *t*-test on the untransformed data with the exception of ²³⁸Pu and ^{239/240}Pu. Although the transformed ^{239/240}Pu data do not pass the Shapiro-Wilk W test, bootstrapping results indicate that the sample mean is sufficiently normal in distribution to perform a *t*-test.

7.5.3 Implementation of the Statistical Test

No specific regulatory thresholds relative to the activity (i.e., concentrations) exist for the radionuclides left in any one tank after decontamination. Rather, the total inventory of radionuclides remaining in all closed components of the TFF will be evaluated following completion of the TFF decontamination efforts. The PA (DOE-ID 2003) conducted to address the DOE Order 435.1 (2001) closure requirements establishes an inventory of radionuclide concentrations remaining in each tank following decontamination. While this established inventory is not the basis for a decision such as continuing to clean a tank, the inventory concentrations can be compared with the concentrations achieved through decontamination efforts. Because of this, hypothesis testing is not required to make decisions concerning whether decontamination of Tank WM-184 may cease; however, hypothesis testing using the modeled value as the AL provides information on the decontamination effort for the radionuclides.

Table 25. Results of the Shapiro-Wilk W test for radionuclides.

Radionuclide	Test Statistic	p-value	Are Data Normal?
²⁴¹ Am	0.8728	0.2781	Yes
⁶⁰ Co	0.8059	0.0905	Yes
¹³⁴ Cs	0.8754	0.2889	Yes
¹³⁷ Cs	0.9010	0.4153	Yes
¹⁵⁴ Eu	0.9159	0.5040	Yes
³ H	0.9259	0.5688	Yes
¹²⁹ I	0.9839	0.9542	Yes
⁹⁴ Nb	0.8309	0.1413	Yes
⁶³ Ni	0.8781	0.3008	Yes
²³⁷ Np	0.9529	0.7582	Yes
²³⁸ Pu	0.6006	0.0006	No
^{239/240} Pu	0.6060	0.0008	No
^{239/240} Pu (ln[ln x] transformation)	0.7431	0.0256	No ^a
²⁴¹ Pu	0.9844	0.9565	Yes
¹²⁵ Sb	0.9853	0.9610	Yes
⁹⁹ Tc ICP-MS	0.9605	0.8115	Yes
Total Sr (⁹⁰ Sr)	0.9390	0.6587	Yes
²³⁴ U	0.9687	0.8668	Yes

a. Although the transformed ^{239/240}Pu data do not pass the Shapiro-Wilk W test, bootstrapping results indicate that the sample mean is sufficiently normal in distribution to perform a *t*-test.

Table 26 provides the UCLs for radionuclides and compares it with the PA modeled inventory (DOE-ID 2003). The *t*-test was performed on the raw data with exception of ²³⁸Pu and ^{239/240}Pu. The bootstrap method was used to determine the 95% UCL for ²³⁸Pu and the *t*-test was performed on the transformed ^{239/240}Pu data. None of these analytes approach the ALs. All of the radionuclides were present in the rinsate at an activity that was significantly less than the activity modeled in the PA (DOE-ID 2003). The data provide a high degree of confidence in deciding that the decontamination efforts were successful in reducing the activity of all radionuclides to below those modeled in the PA (DOE-ID 2003).

Table 26. Summary of post-decontamination activities of radionuclides in the rinsate of Tank WM-184.

Radionuclide	Mean Concentration	95% UCL	Units	Inventory Level	Inventory Level Exceeded?
²⁴¹ Am	1.49E+04	2.21E+04	pCi/L	3.60E+07	No
⁶⁰ Co	7.45E+03	1.01E+04	pCi/L	1.40E+07	No
¹³⁴ Cs	7.31E+03	1.10E+04	pCi/L	1.21E+06	No
¹³⁷ Cs	1.73E+07	2.45E+07	pCi/L	1.15E+11	No
¹⁵⁴ Eu	2.12E+04	3.01E+04	pCi/L	1.83E+08	No
³ H	4.56E+03	5.02E+03	pCi/L	1.61E+07	No
¹²⁹ I	7.15E+01	8.14E+01	pCi/L	7.44E+04	No
⁹⁴ Nb	1.40E+04	2.35E+04	pCi/L	3.44E+06	No
⁶³ Ni	2.24E+03	2.82E+03	pCi/L	8.70E+07	No
²³⁷ Np	1.10E+03	1.74E+03	pCi/L	3.43E+05	No
²³⁸ Pu	1.30E+06	2.13E+06 ^a	pCi/L	5.70E+08	No
^{239/240} Pu (ln[ln x] transformation)	2.49E+00	2.56E+00	pCi/L	1.81E+01	No
²⁴¹ Pu	3.14E+06	5.59E+06	pCi/L	4.24E+08	No
¹²⁵ Sb	6.59E+04	1.15E+05	pCi/L	1.49E+06	No
⁹⁹ Tc	8.40E+02	1.03E+03	pCi/L	2.99E+07	No
Total Sr (⁹⁰ Sr)	2.81E+06	3.09E+06	pCi/L	8.15E+10	No
²³⁴ U	2.47E+02	3.34E+02	pCi/L	2.52E+06	No

a. UCL was computed using the bootstrap method.

It can be seen from the results in Table 26 that remediation goals have been met with regards to the radionuclides in question in Tank WM-184.

8. CONCLUSIONS

The data assessed in this report were generated from the sample analysis of residual tank liquids remaining after decontamination. Because decontamination activities reduced the volume of solids remaining in the tank to less than 15% by volume of the total sample collected, the solids portion of the samples collected were not analyzed. Data from the analysis of the liquid samples from the tank vault sumps or diversion valve boxes are not analyzed in this document but will be addressed in a subsequent report. No significant data quality issues that would negatively impact the data usability were identified. The residual tank liquids data were assessed, and the statistical results presented in Section 7 demonstrate that all closure performance standards have been met. It can be concluded that decontamination efforts in Tank WM-184 have been successful.

9. REFERENCES

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Appendix A

Graphical Representation of Metals Data

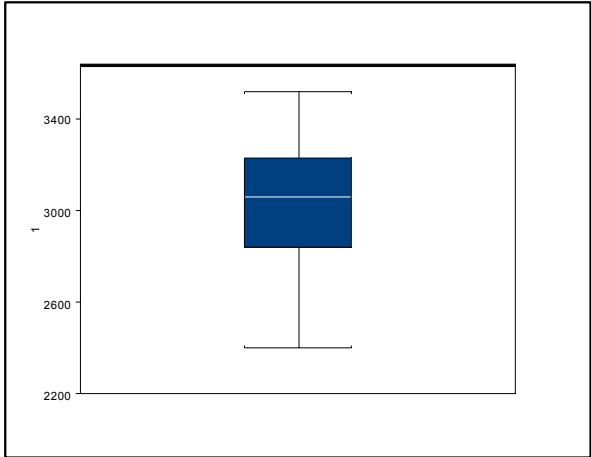


Figure A-1. Boxplot for aluminum.

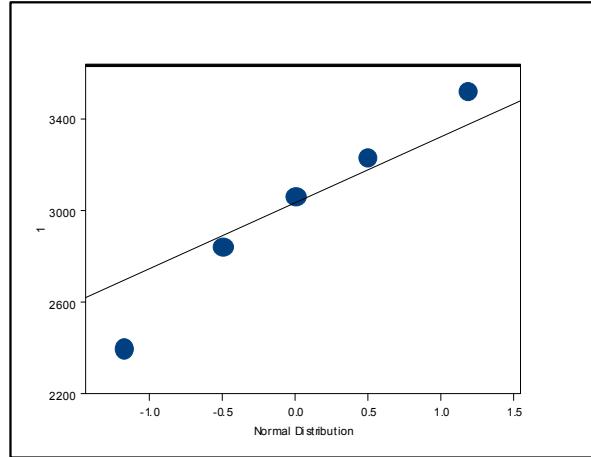


Figure A-2. Normal-quantile plot for aluminum.

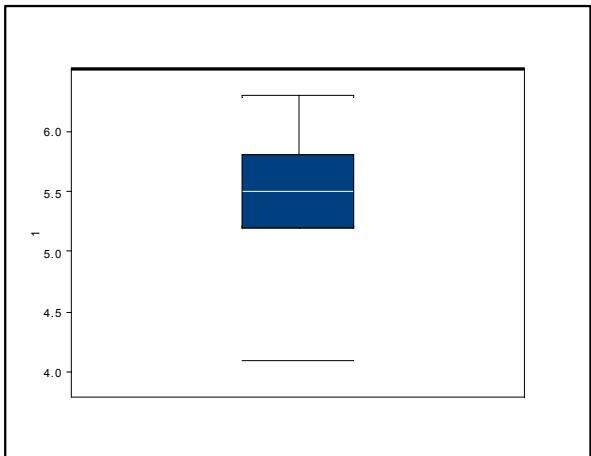


Figure A-3. Boxplot for cadmium.

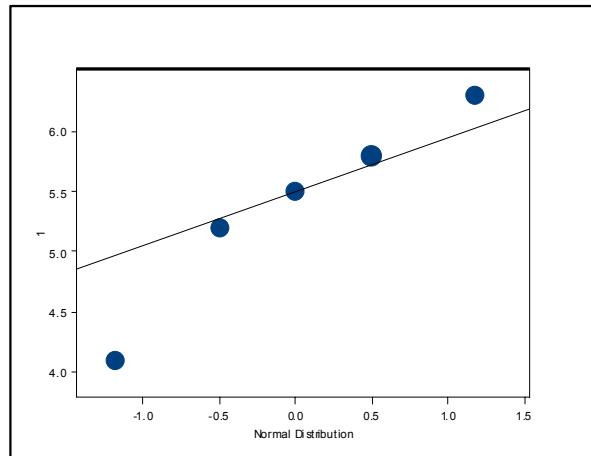


Figure A-4. Normal-quantile plot for cadmium.

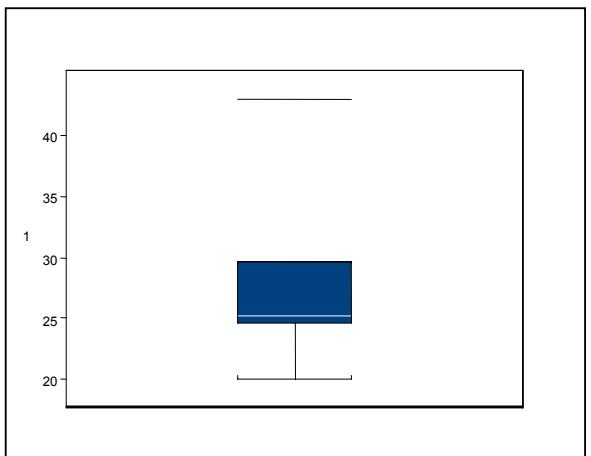


Figure A-5. Boxplot for chromium.

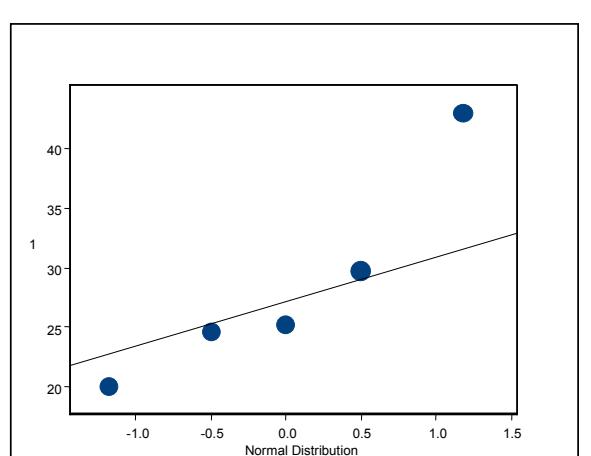


Figure A-6. Normal-quantile plot for chromium.

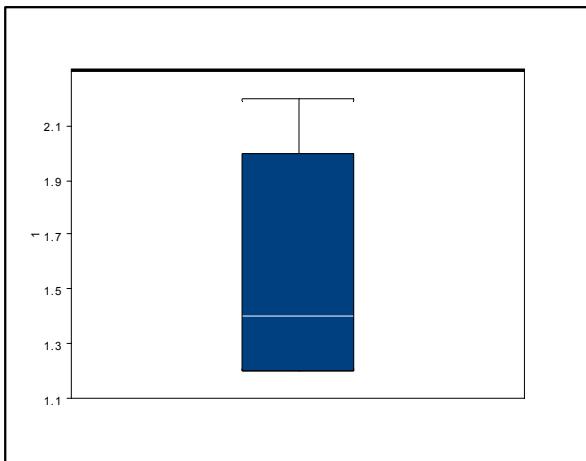


Figure A-7. Boxplot for cobalt.

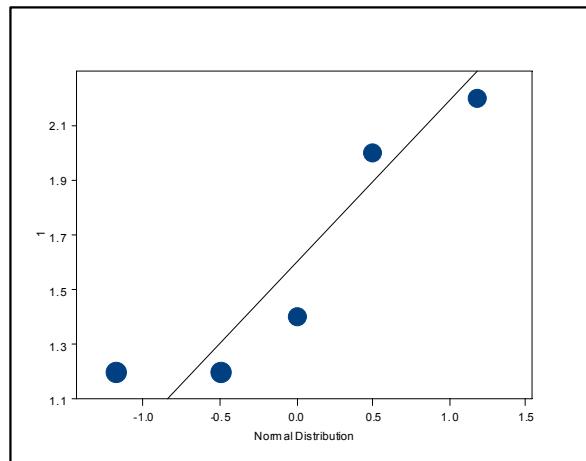


Figure A-8. Normal-quantile plot for cobalt.

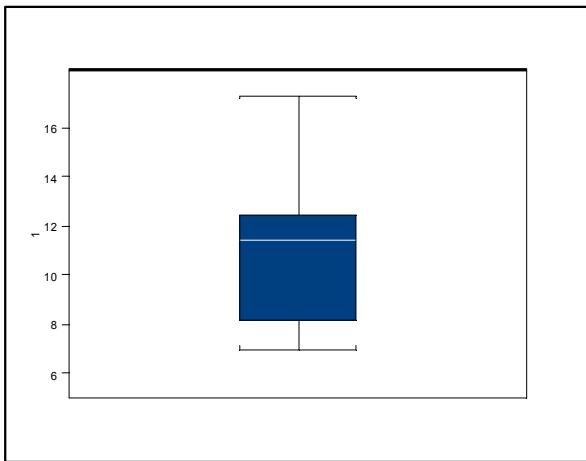


Figure A-9. Boxplot for copper.

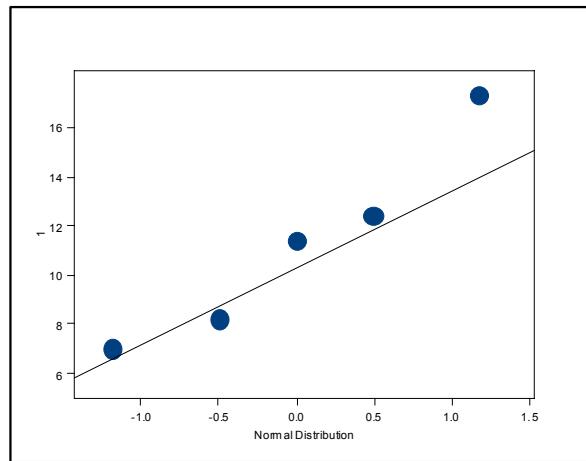


Figure A-10. Normal-quantile plot for copper.

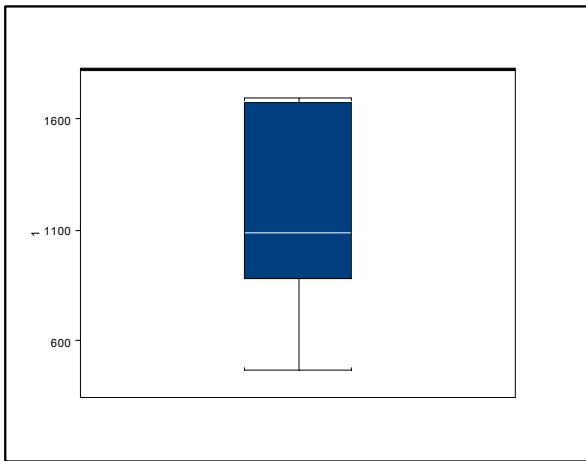


Figure A-11. Boxplot for iron.

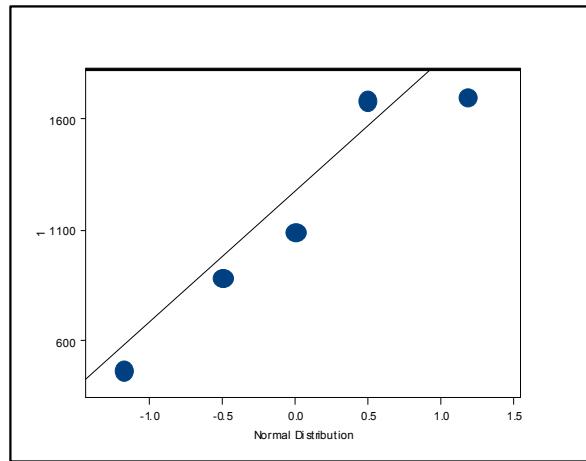


Figure A-12. Normal-quantile plot for iron.

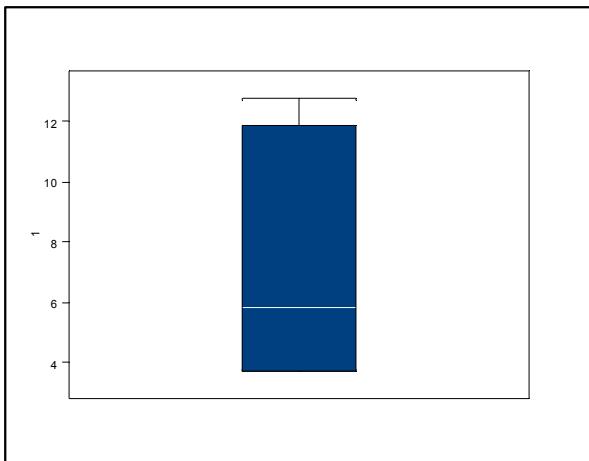


Figure A-13. Boxplot for lead.

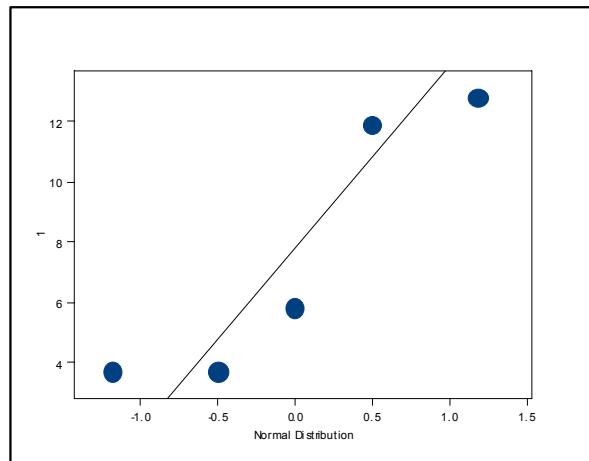


Figure A-14. Normal-quantile plot for lead.

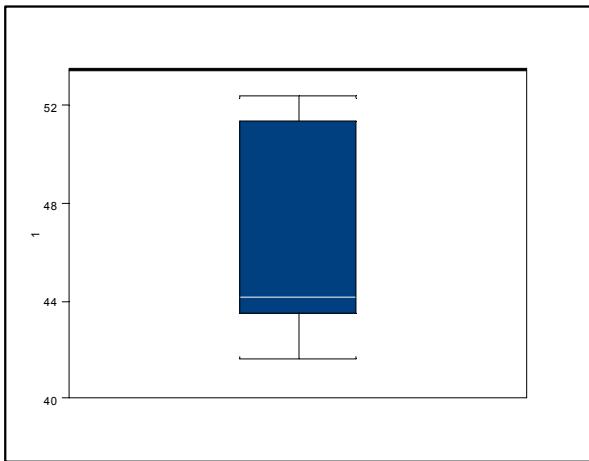


Figure A-15. Boxplot for magnesium.

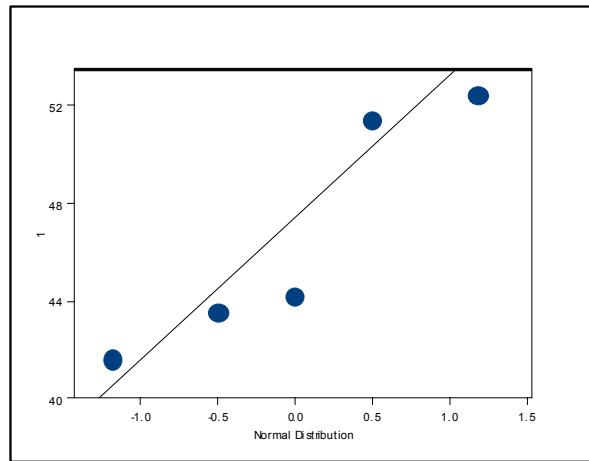


Figure A-16. Normal-quantile plot for magnesium.

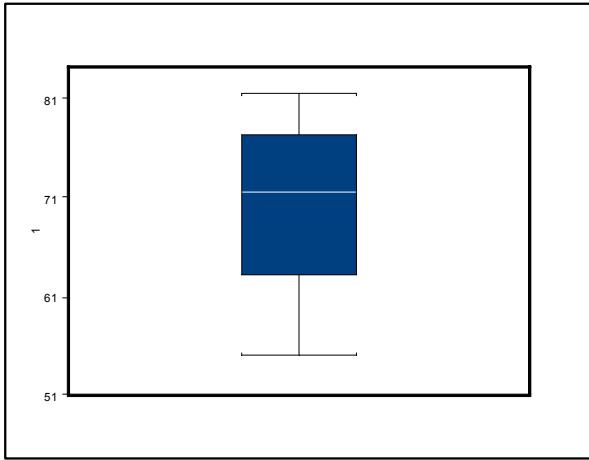


Figure A-17. Boxplot for manganese.

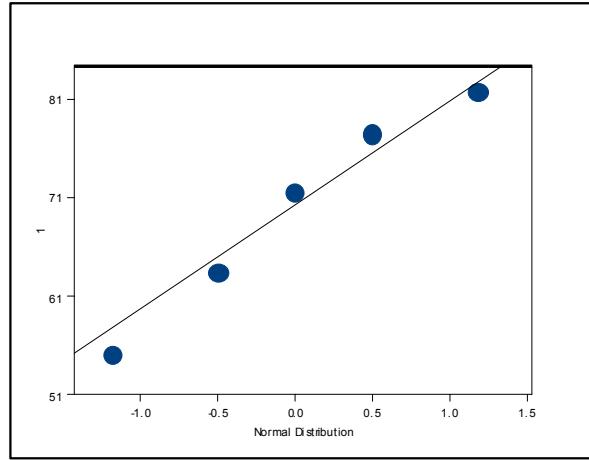


Figure A-18. Normal-quantile plot for manganese.

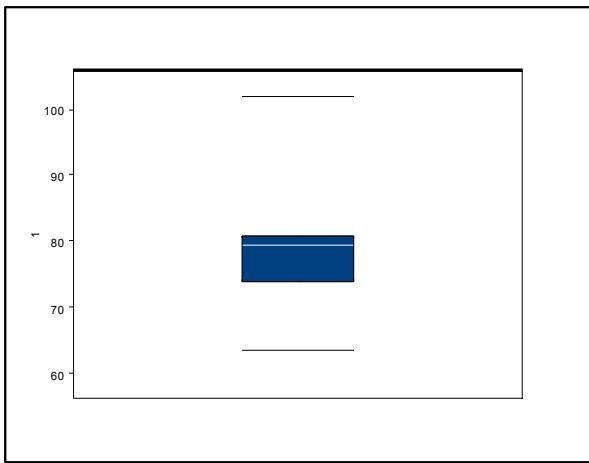


Figure A-19. Boxplot for mercury.

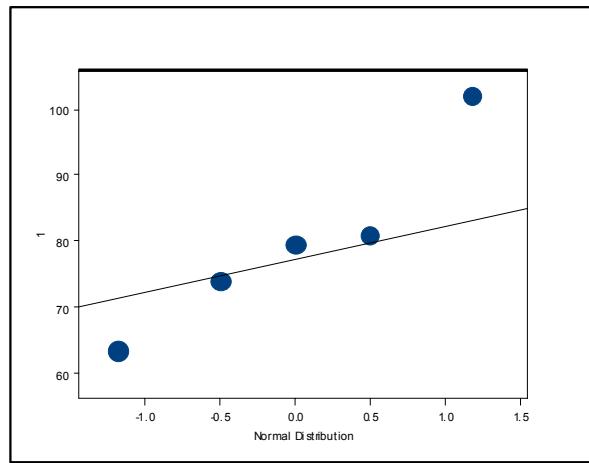


Figure A-20. Normal-quantile plot for mercury.

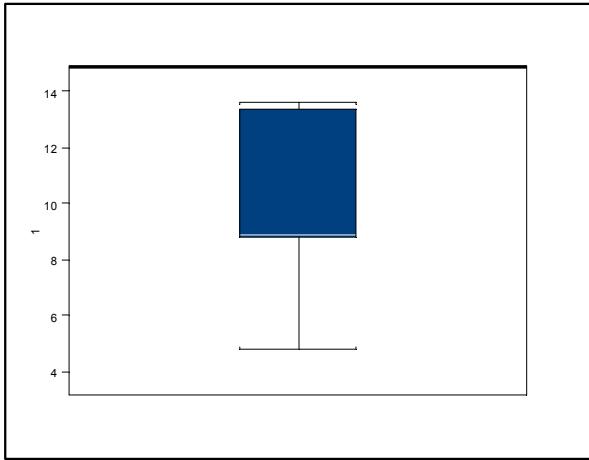


Figure A-21. Boxplot for molybdenum.

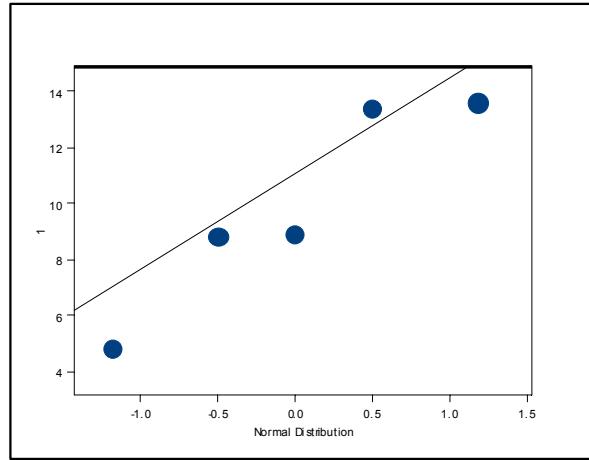


Figure A-22. Normal-quantile plot for molybdenum.

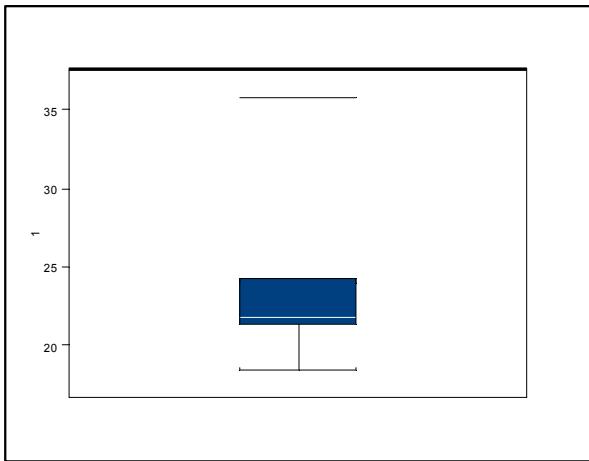


Figure A-23. Boxplot for nickel.

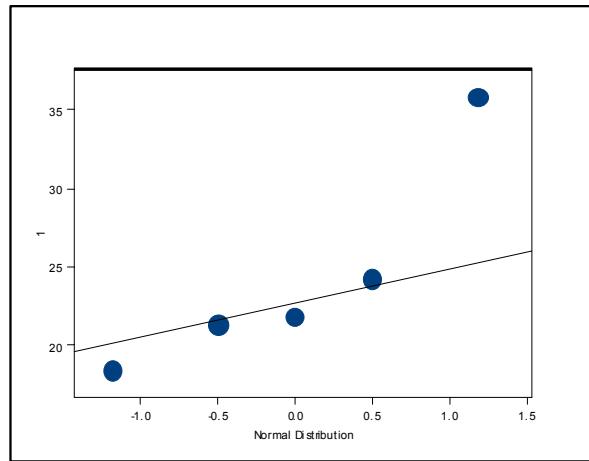


Figure A-24. Normal-quantile plot for nickel.

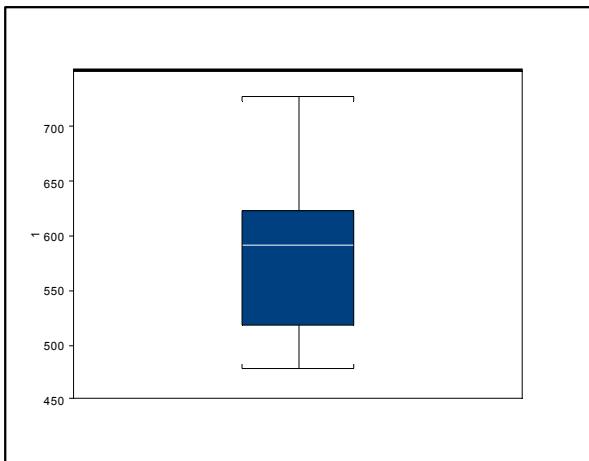


Figure A-25. Boxplot for potassium.

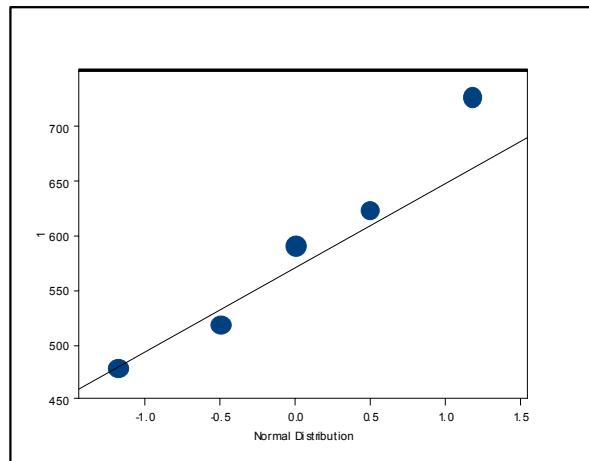


Figure A-26. Normal-quantile plot for potassium.

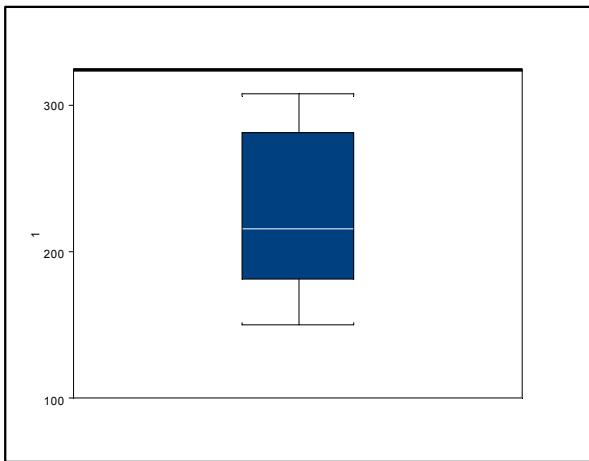


Figure A-27. Boxplot for silver.

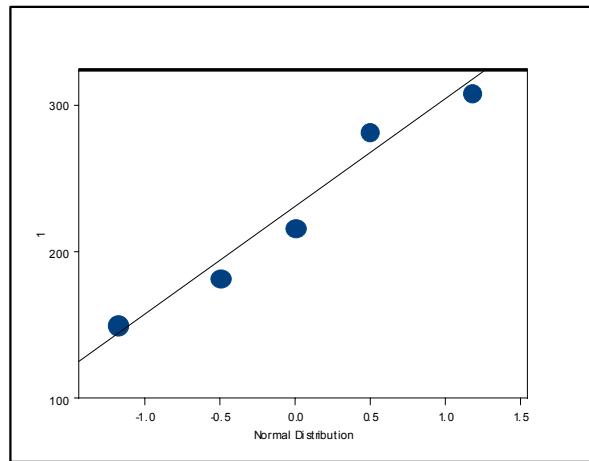


Figure A-28. Normal-quantile plot for silver.

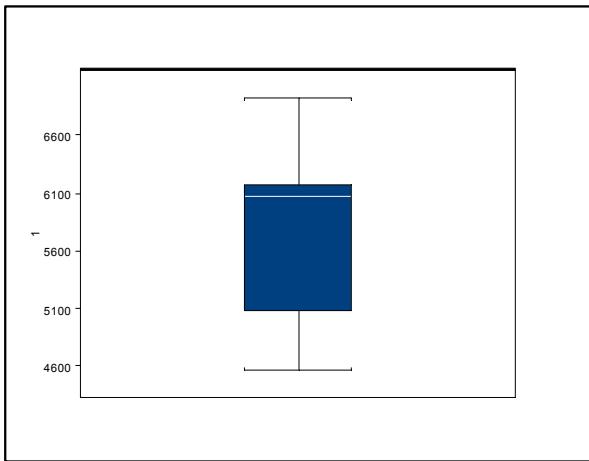


Figure A-29. Boxplot for sodium.

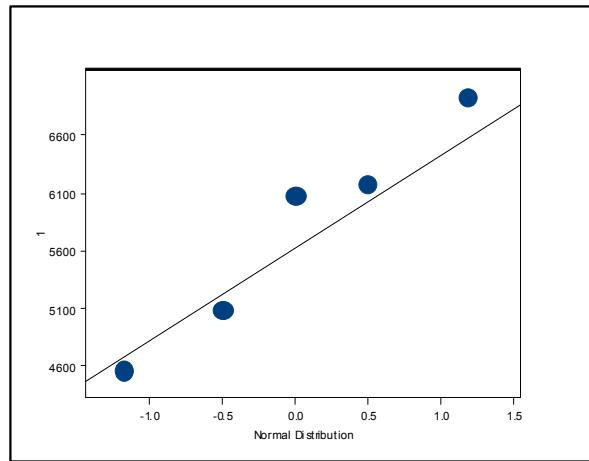
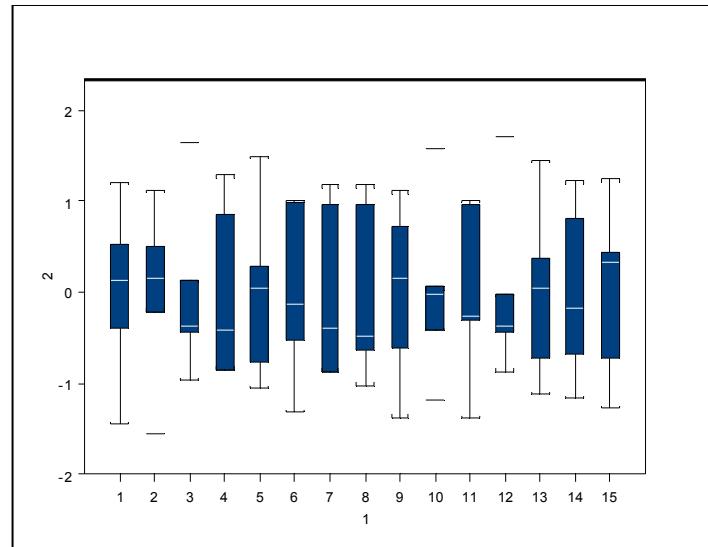


Figure A-30. Normal-quantile plot for sodium.



Metal	Number
Aluminum	1
Cadmium	2
Chromium	3
Cobalt	4
Copper	5
Iron	6
Lead	7
Magnesium	8
Manganese	9
Mercury	10
Molybdenum	11
Nickel	12
Potassium	13
Silver	14
Sodium	15

Figure A-31. Grouped boxplots of metals data. Data have been standardized so that distributions are directly comparable.

Appendix B

Graphical Representation of Anions Data

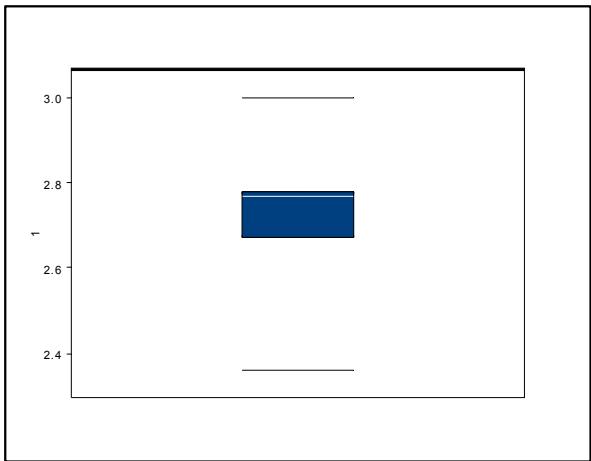


Figure B-1. Boxplot of chloride.

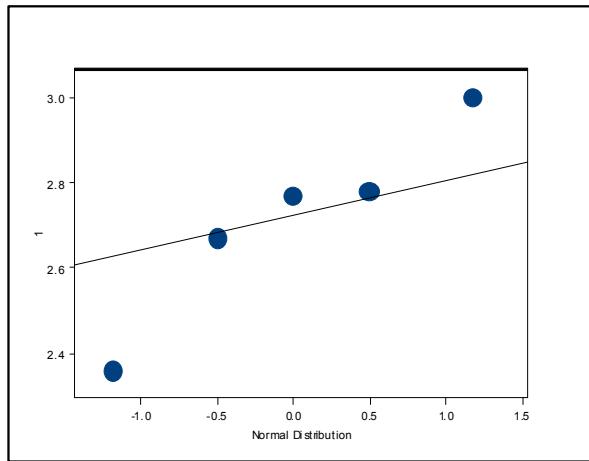


Figure B-2. Normal-quantile plot of chloride.

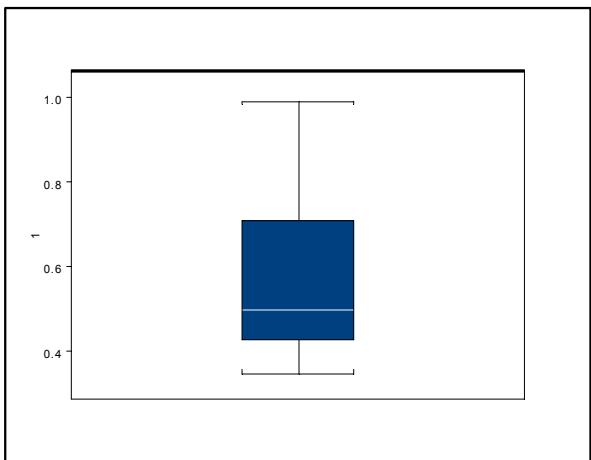


Figure B-3. Boxplot of fluoride.

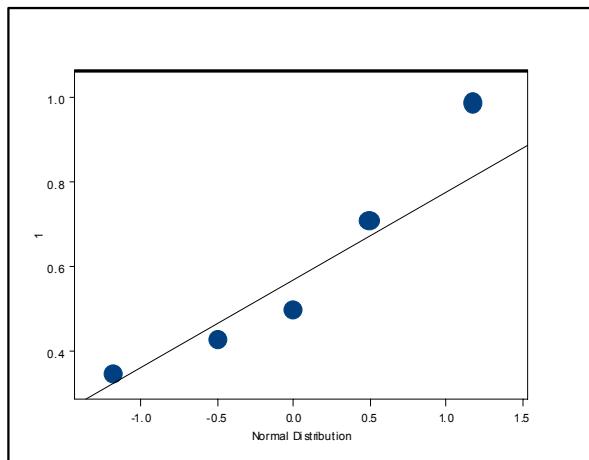


Figure B-4. Normal-quantile plot of fluoride.

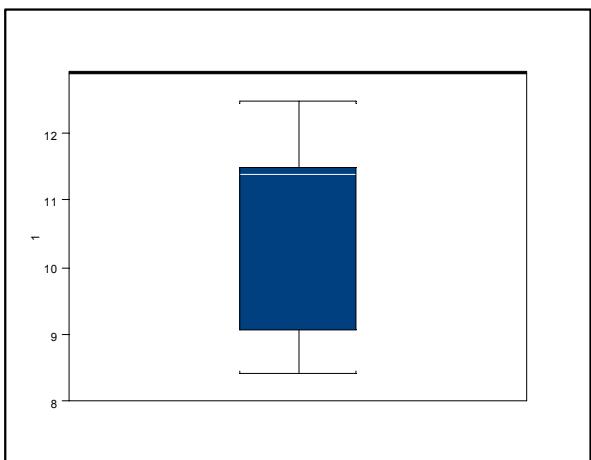


Figure B-5. Boxplot of nitrate.

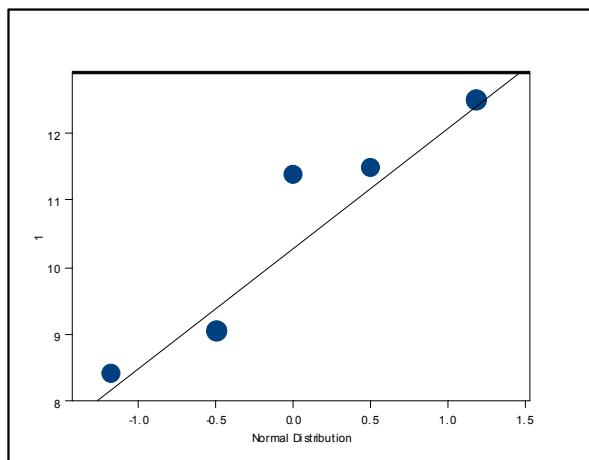


Figure B-6. Normal-quantile plot of nitrate.

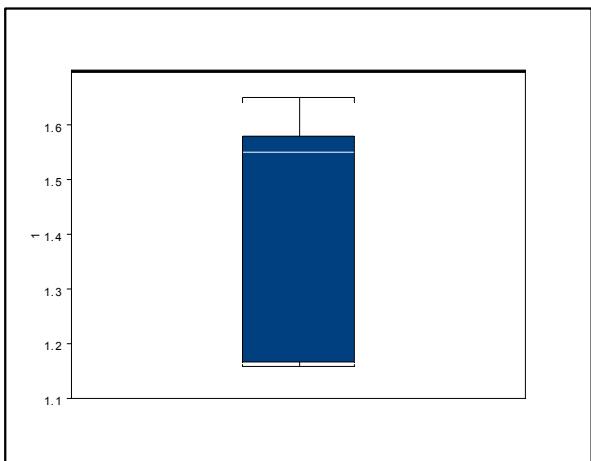


Figure B-7. Boxplot of sulfate.

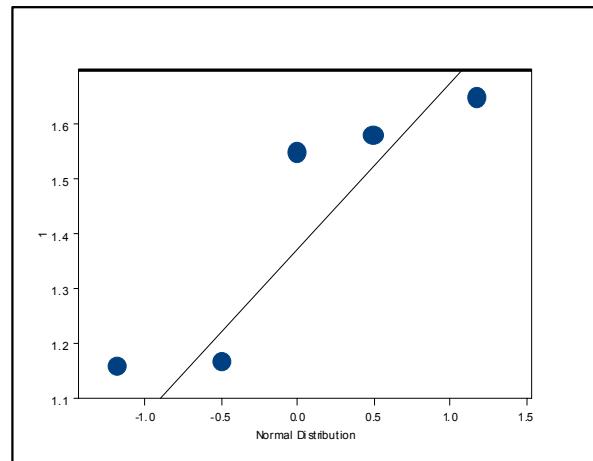
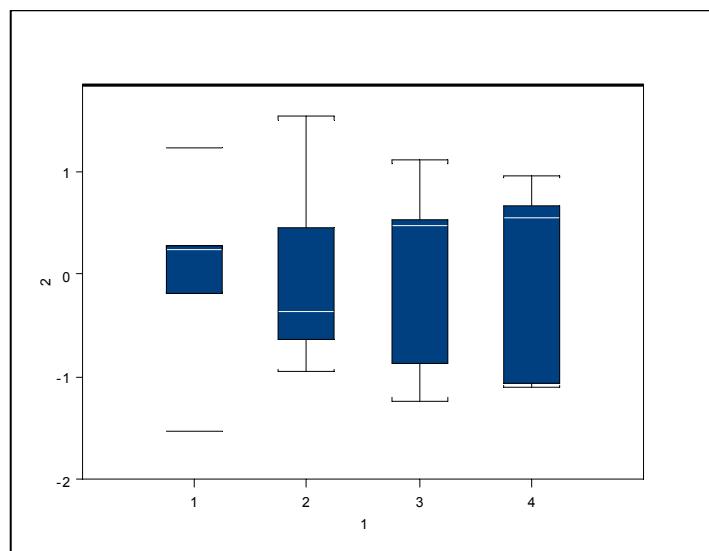


Figure B-8. Normal-quantile plot of sulfate.



Anions	Number
Chloride	1
Fluoride	2
Nitrate	3
Sulfate	4

Figure B-9. Grouped boxplots of anions data. Data have been standardized so that distributions are directly comparable.

Appendix C

Graphical Representation of pH Data

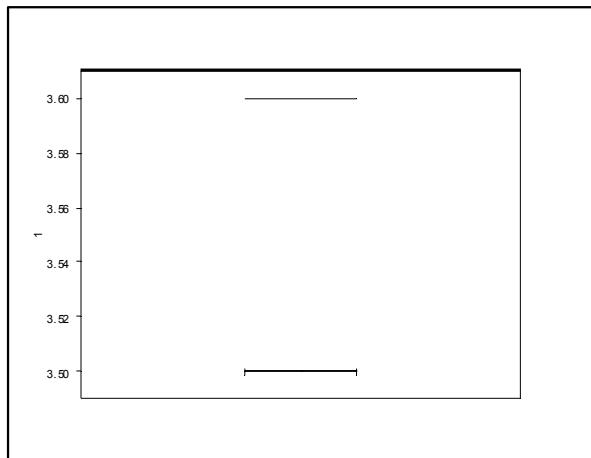


Figure C-1. Boxplot for pH.

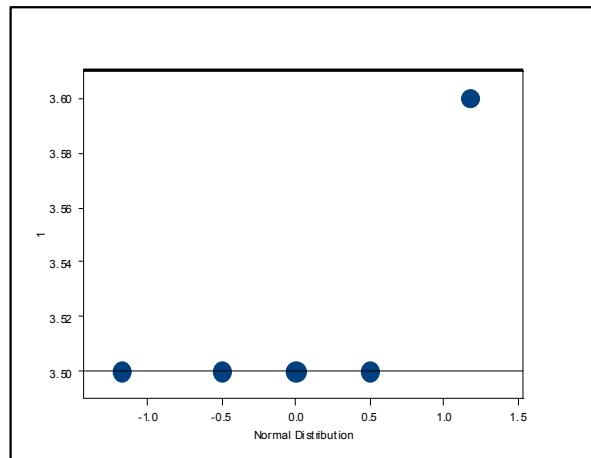


Figure C-2. Normal-quantile plot for pH.

Appendix D

Graphical Representation of Organic Data

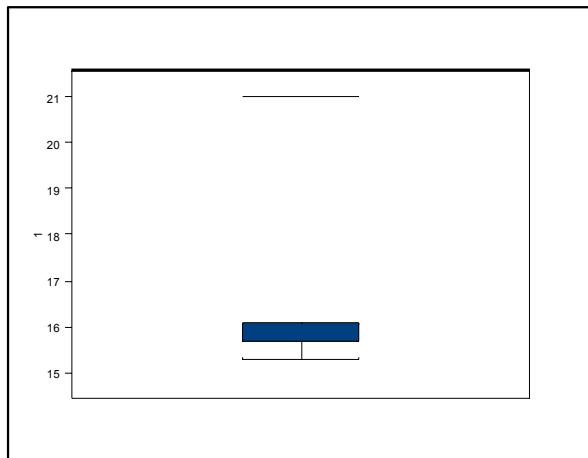


Figure D-1. Boxplot for 2,4-dinitrophenol.

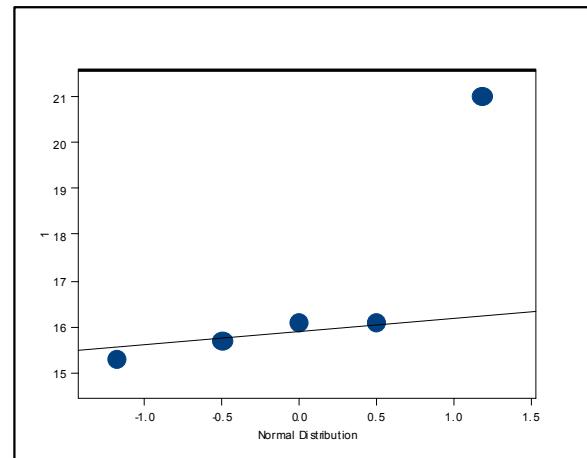


Figure D-2. Normal-quantile plot for 2,4-dinitrophenol.

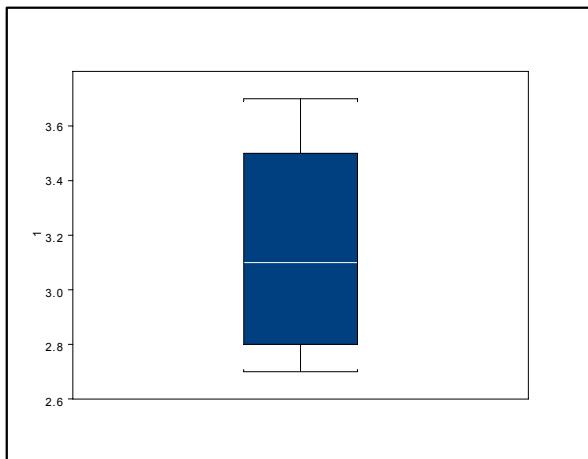


Figure D-3. Boxplot for phenol.

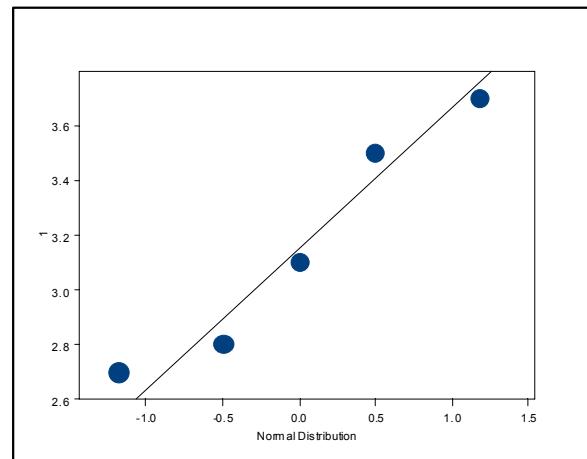


Figure D-4. Normal-quantile plot for phenol.

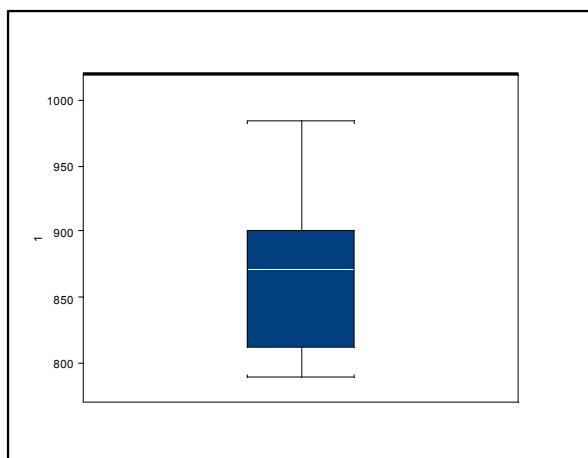


Figure D-5. Boxplot for tri-n-butyl phosphate.

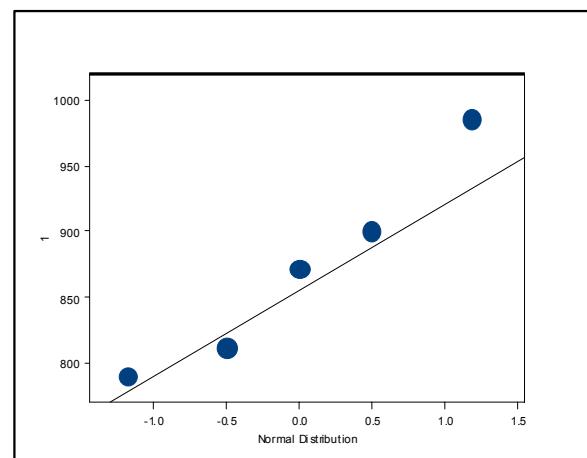
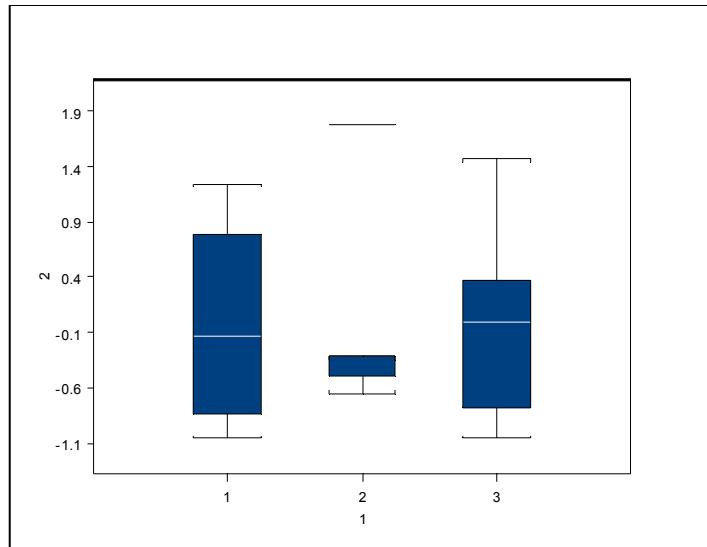


Figure D-6. Normal-quantile plot for tri-n-butyl phosphate.



Organic	Number
2,4-dinitrophenol	1
Phenol	2
Tri-n-butyl phosphate	3

Figure D-7. Grouped boxplots of organics data. Data have been standardized so that distributions are directly comparable.

Appendix E

Graphical Representation of Radionuclide Data

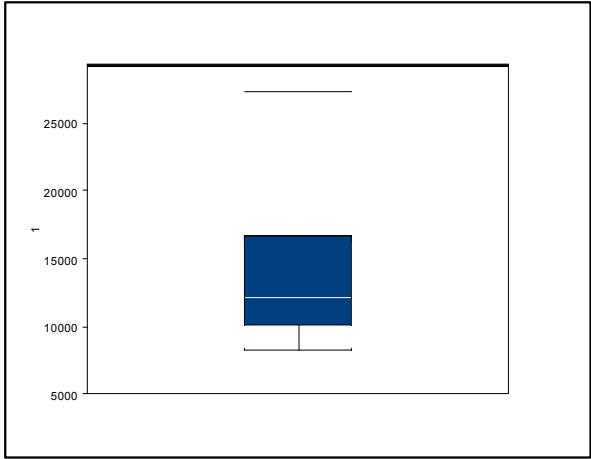


Figure E-1. Boxplot for ^{241}Am data.

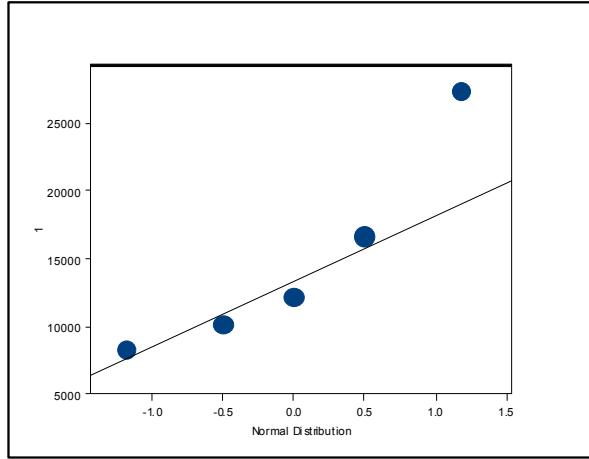


Figure E-2. Normal-quantile plot for ^{241}Am data.

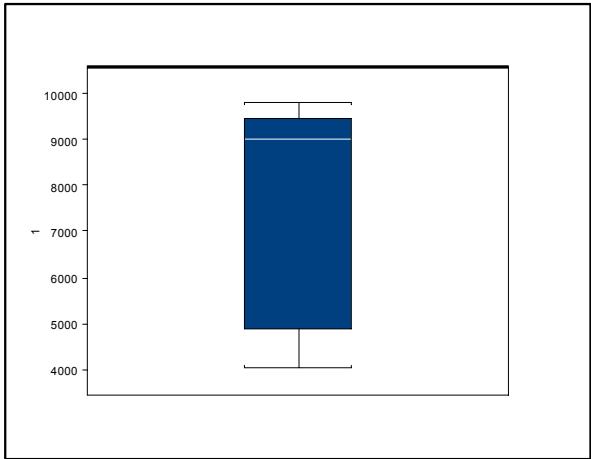


Figure E-3. Boxplot for ^{60}Co data.

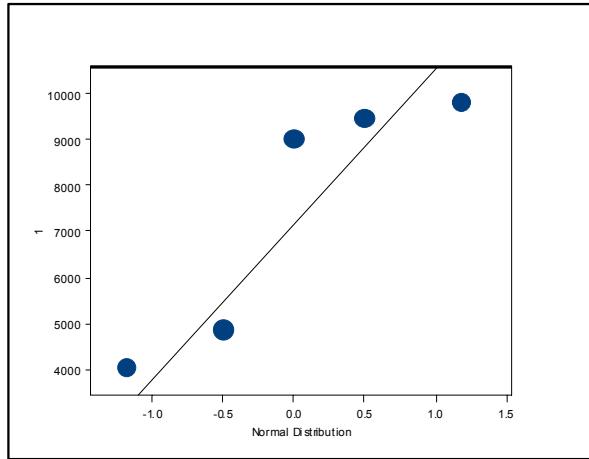


Figure E-4. Normal-quantile plot for ^{60}Co data.

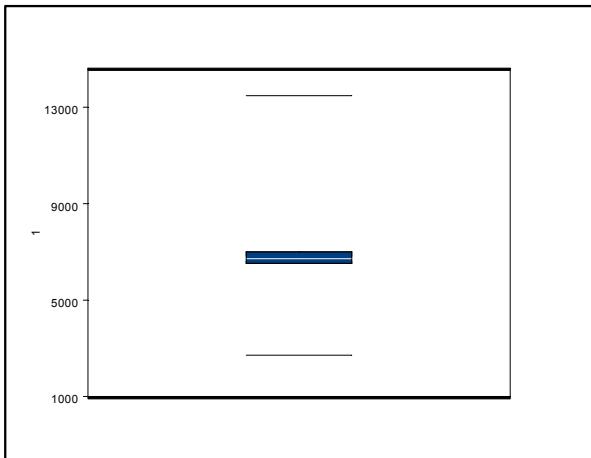


Figure E-5. Boxplot for ^{134}Cs data.

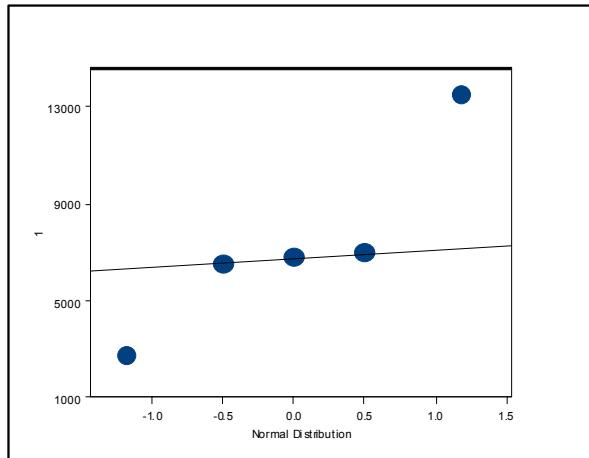


Figure E-6. Normal-quantile plot for ^{134}Cs data.

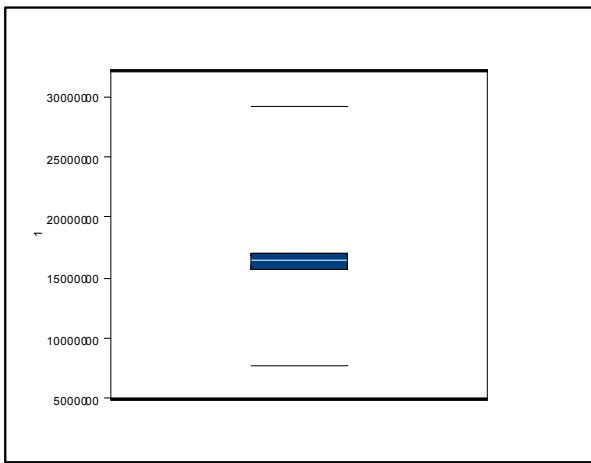


Figure E-7. Boxplot for ^{137}Cs data.

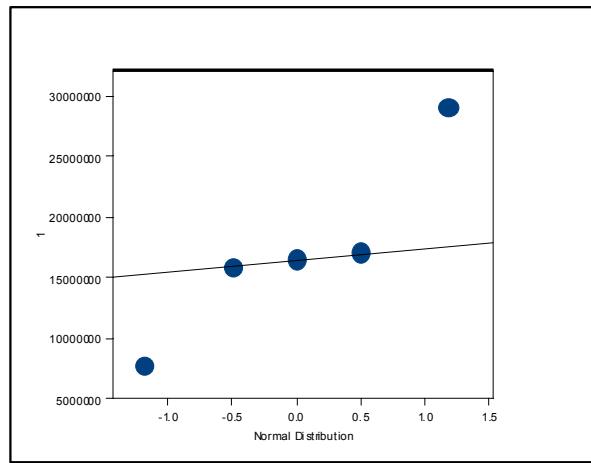


Figure E-8. Normal-quantile plot for ^{137}Cs data.

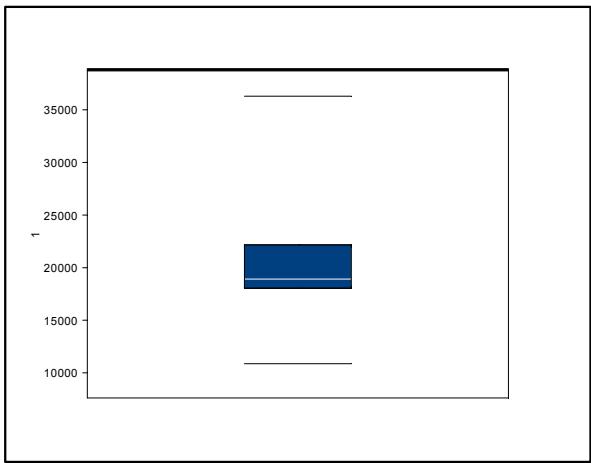


Figure E-9. Boxplot for ^{154}Eu data.

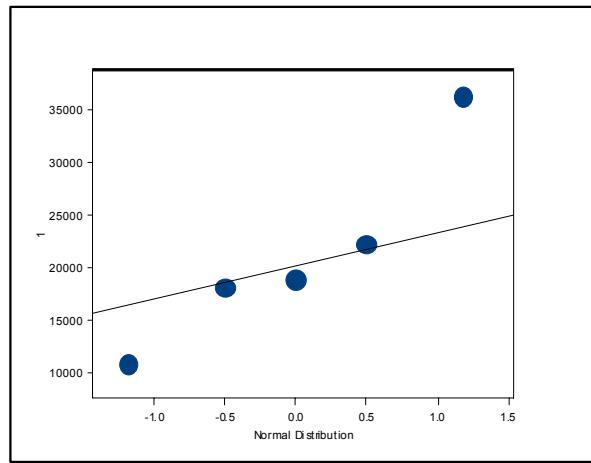


Figure E-10. Normal-quantile plot for ^{154}Eu data.

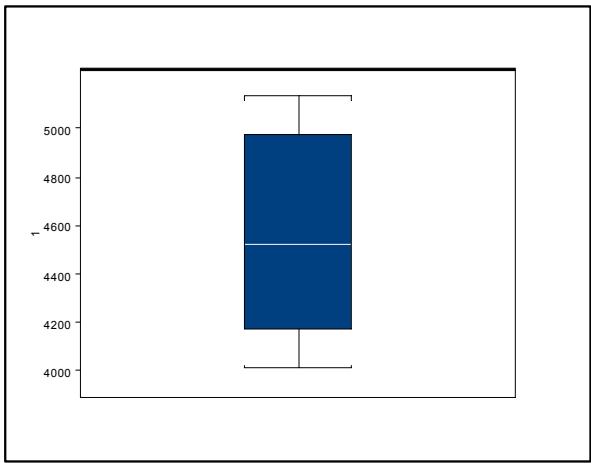


Figure E-11. Boxplot for ^3H data.

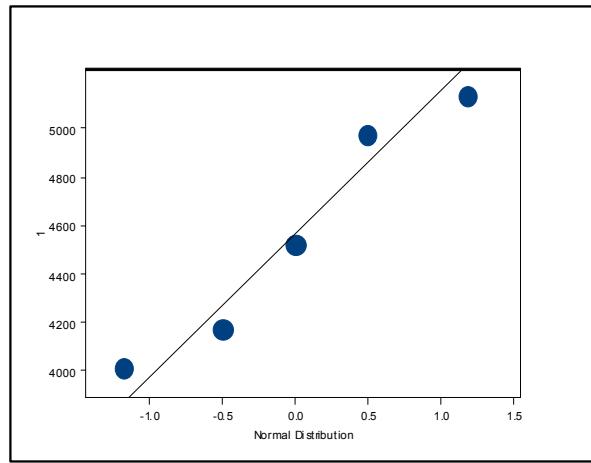


Figure E-12. Normal-quantile plot for ^3H data.

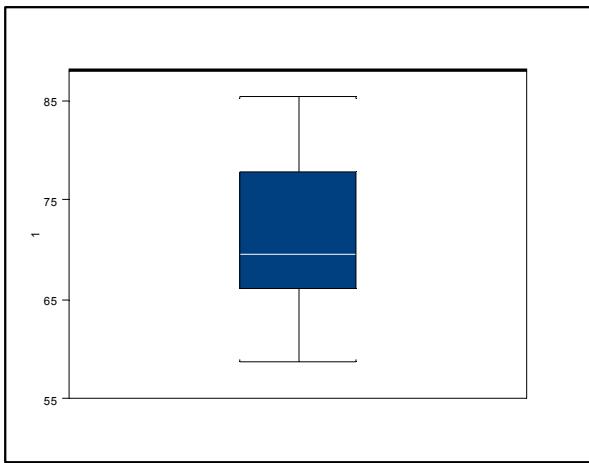


Figure E-13. Boxplot for ^{129}I data.

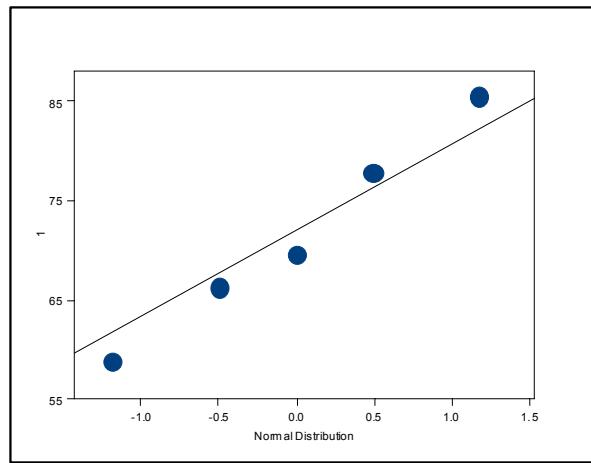


Figure E-14. Normal-quantile plot for ^{129}I data.

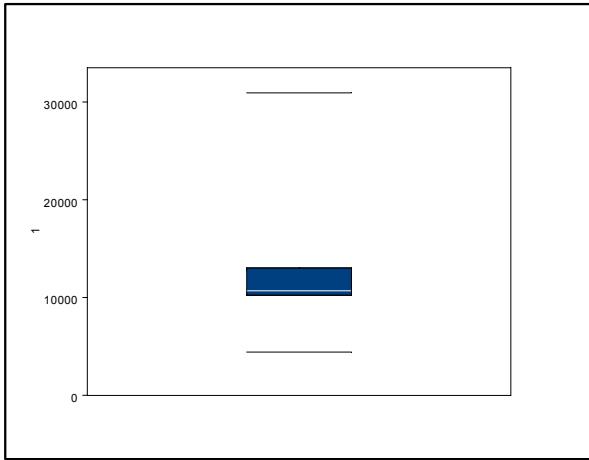


Figure E-15. Boxplot for ^{94}Nb data.

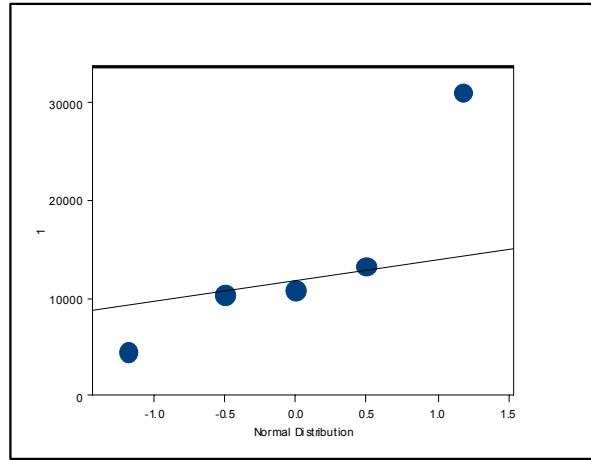


Figure E-16. Normal-quantile plot for ^{94}Nb data.

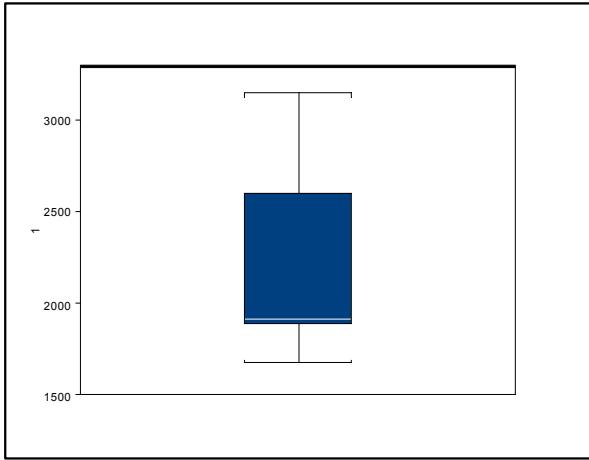


Figure E-17. Boxplot for ^{63}Ni data.

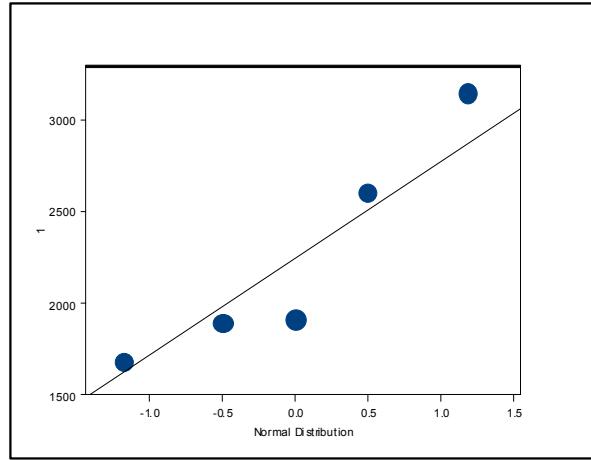


Figure E-18. Normal-quantile plot for ^{63}Ni data.

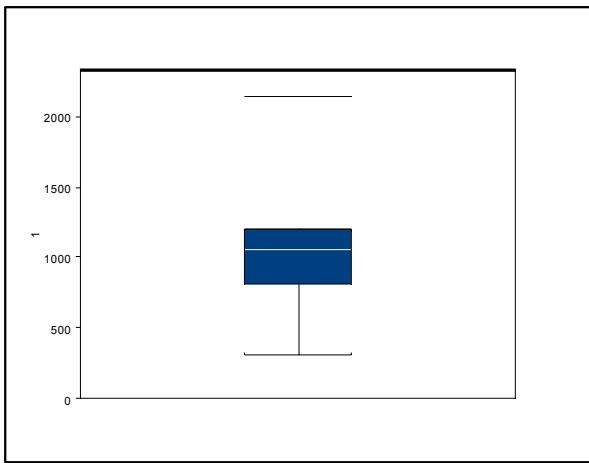


Figure E-19. Boxplot for ^{237}Np data.

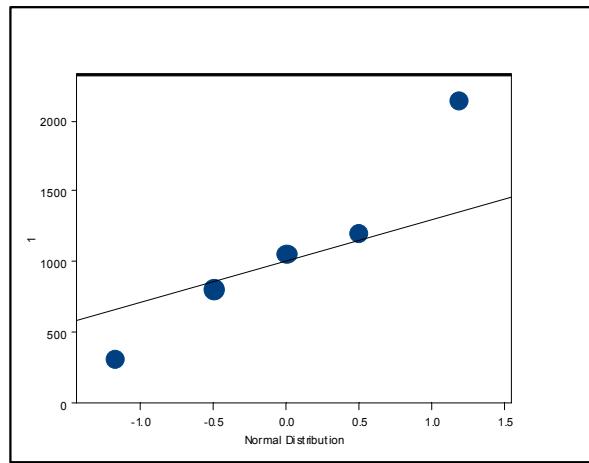


Figure E-20. Normal-quantile plot for ^{237}Np data.

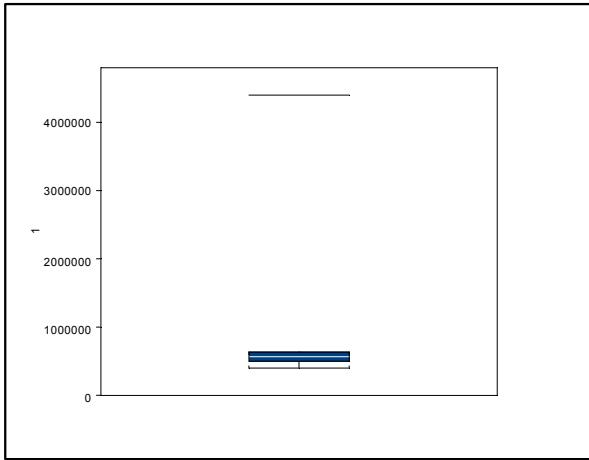


Figure E-21. Boxplot for ^{238}Pu data.

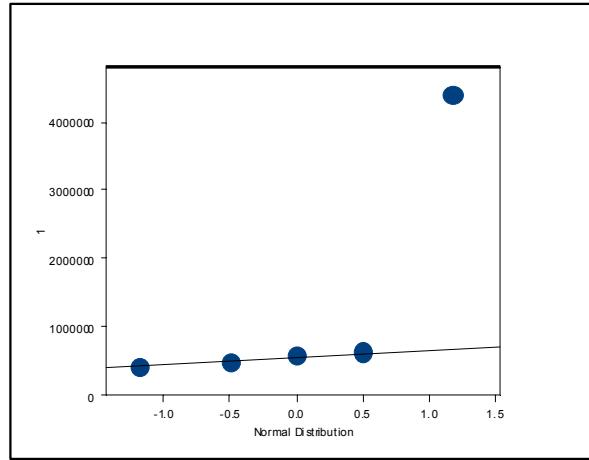


Figure E-22. Normal-quantile plot for ^{238}Pu data.

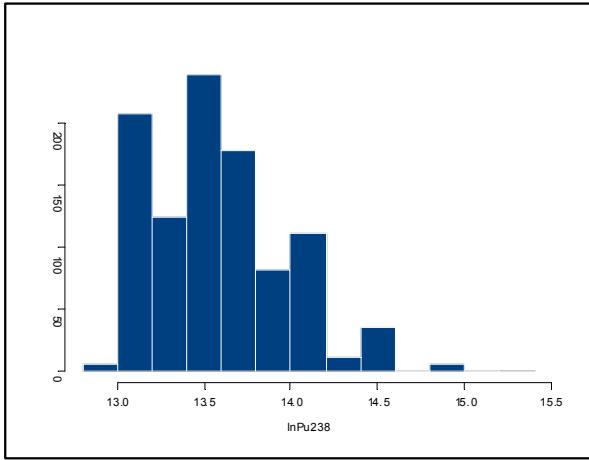


Figure E-23. Histogram for bootstrapping results for $\ln(^{238}\text{Pu})$ data.

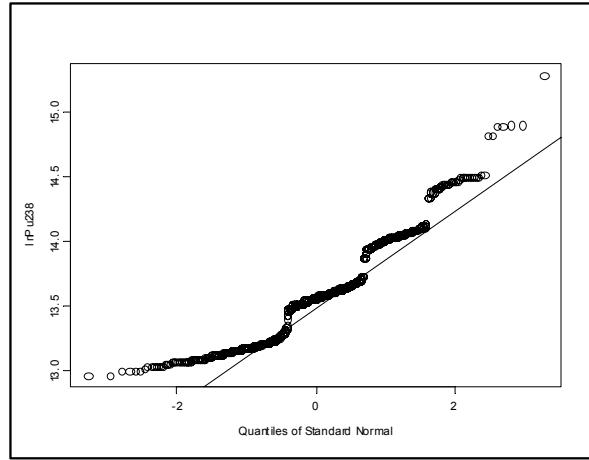


Figure E-24. Normal-quantile plot of bootstrapping results for $\ln(^{238}\text{Pu})$ data.

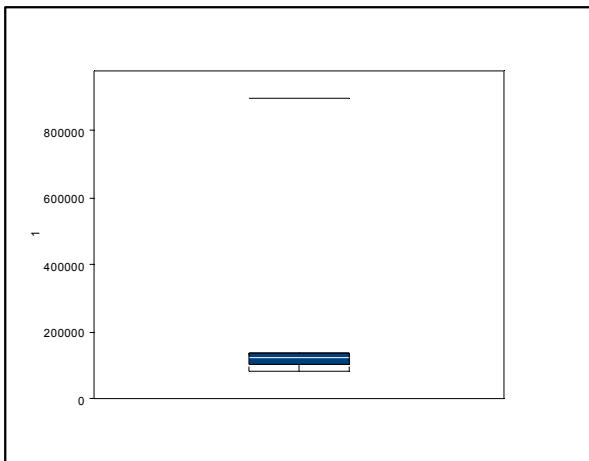


Figure E-25. Boxplot for $^{239}/^{240}\text{Pu}$ data.

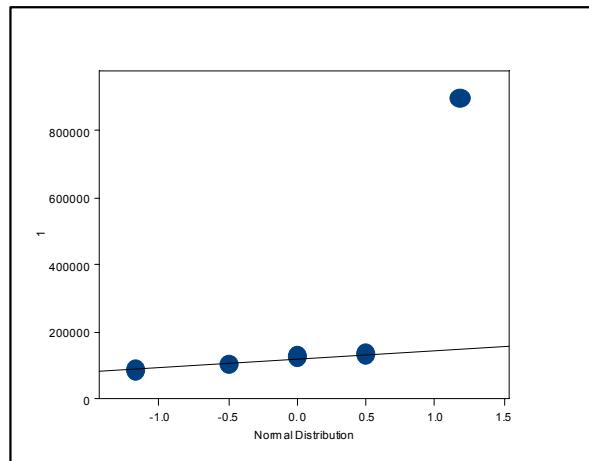


Figure E-26. Normal-quantile plot for $^{239}/^{240}\text{Pu}$ data.

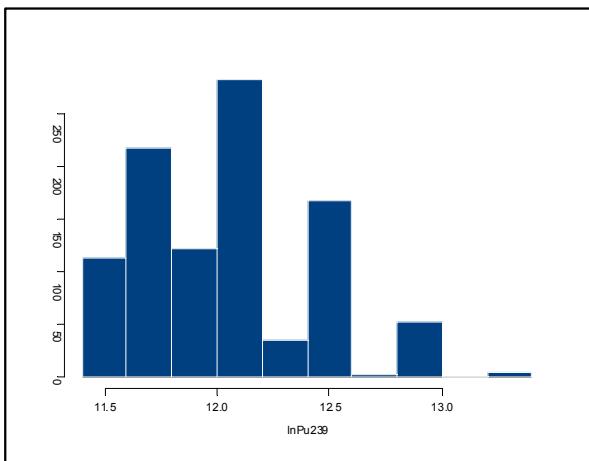


Figure E-27. Histogram of bootstrapping results for $\ln(^{239}/^{240}\text{Pu})$ data.

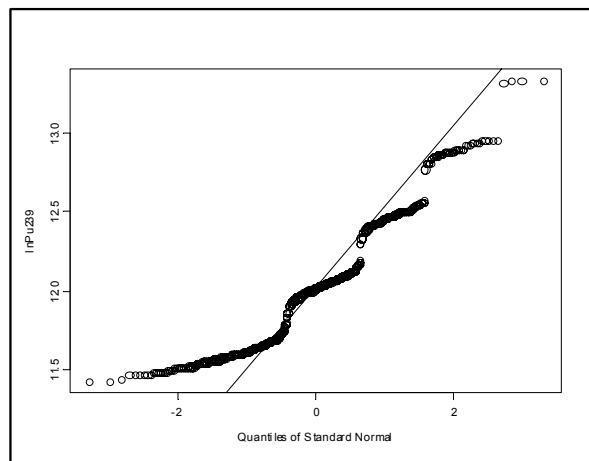


Figure E-28. Normal-quantile plot of bootstrapping results for $\ln(^{239}/^{240}\text{Pu})$ data.

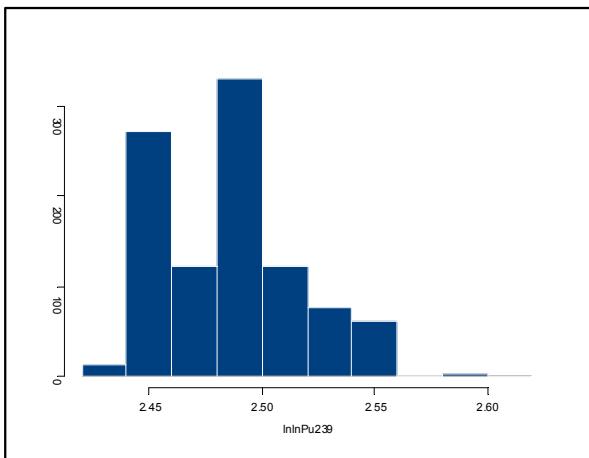


Figure E-29. Histogram of bootstrapping results for $^{239}/^{240}\text{Pu}$ ($\ln[\ln x]$ transformation) data.

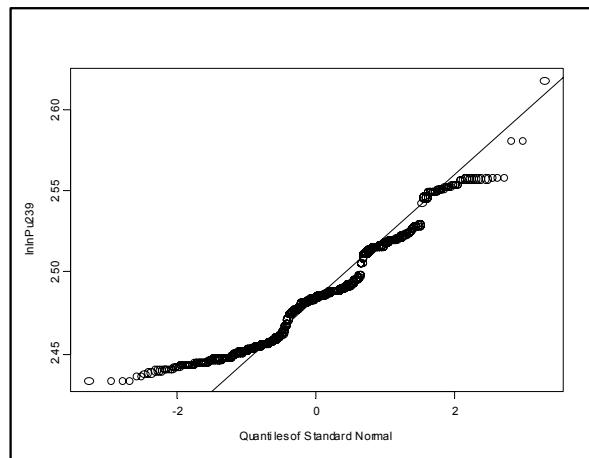


Figure E-30. Normal-quantile plot of bootstrapping results for $^{239}/^{240}\text{Pu}$ ($\ln[\ln x]$ transformation) data.

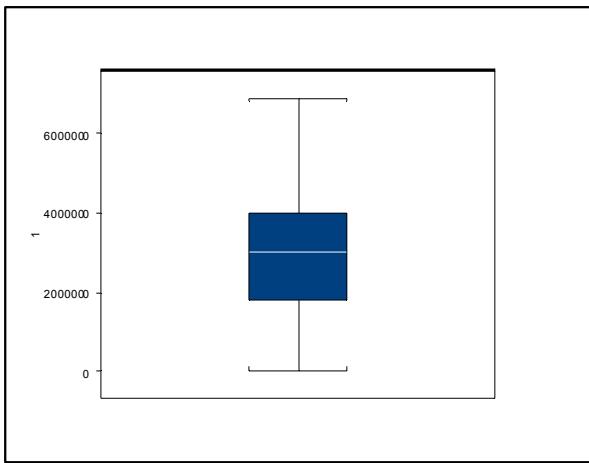


Figure E-31. Boxplot for ^{241}Pu data.

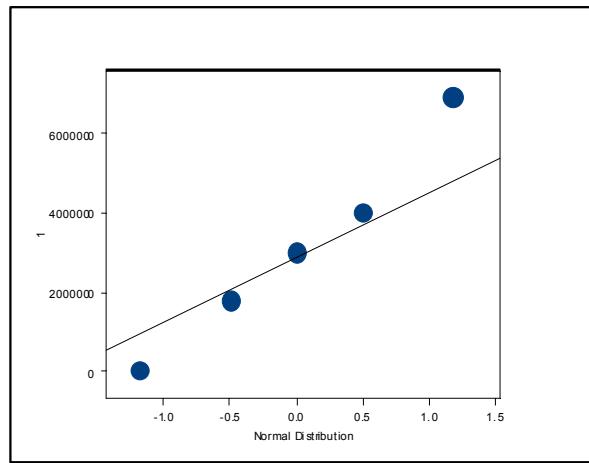


Figure E-32. Normal-quantile plot for ^{241}Pu data.

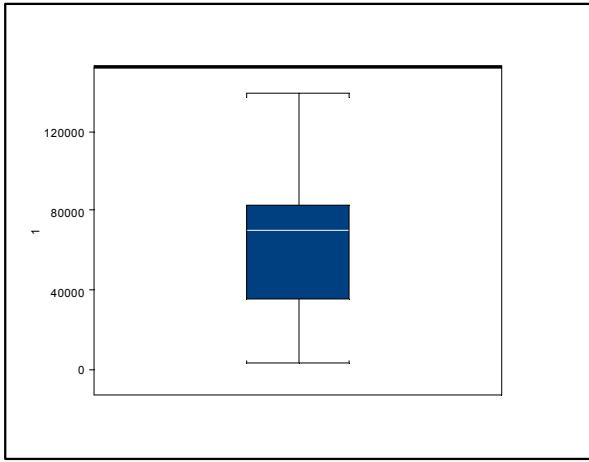


Figure E-33. Boxplot for ^{125}Sb data.

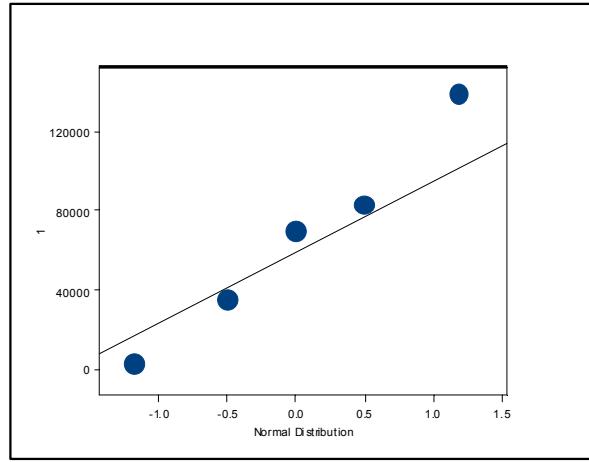


Figure E-34. Normal-quantile plot for ^{125}Sb data.

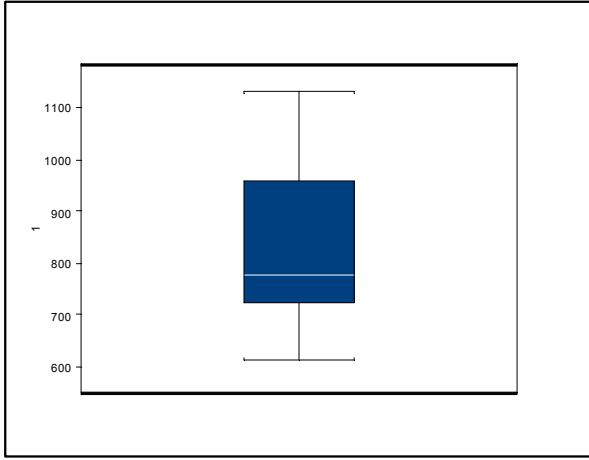


Figure E-35. Boxplot for $^{99}\text{Tc-99}$ ICP-MS data.

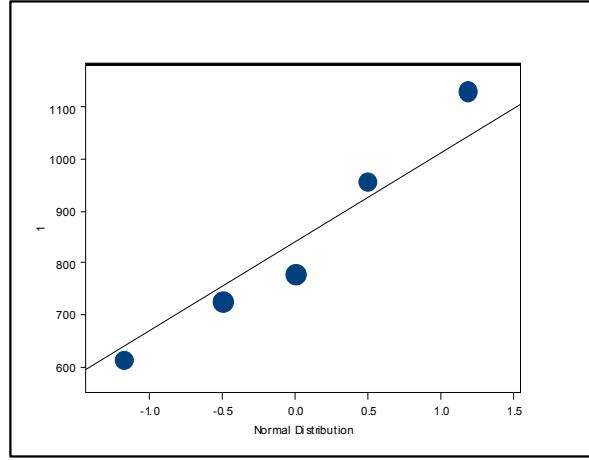


Figure E-36. Normal-quantile plot for $^{99}\text{Tc-99}$ ICP-MS data.

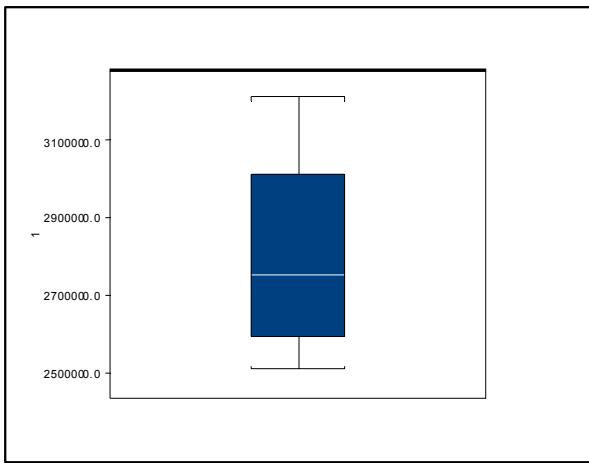


Figure E-37. Boxplot for Total Sr (^{90}Sr) data.

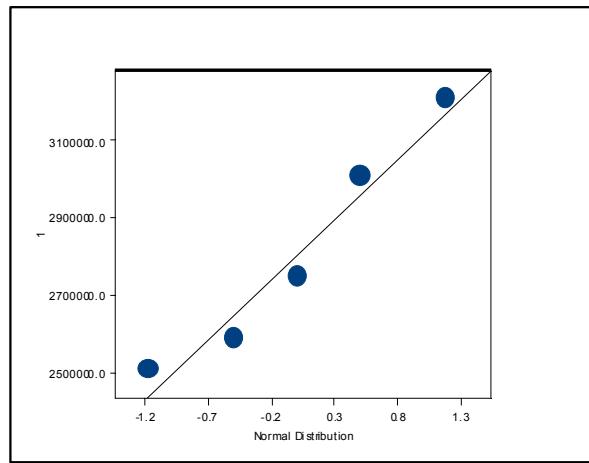


Figure E-38. Normal-quantile plot for Total Sr (^{90}Sr) data.

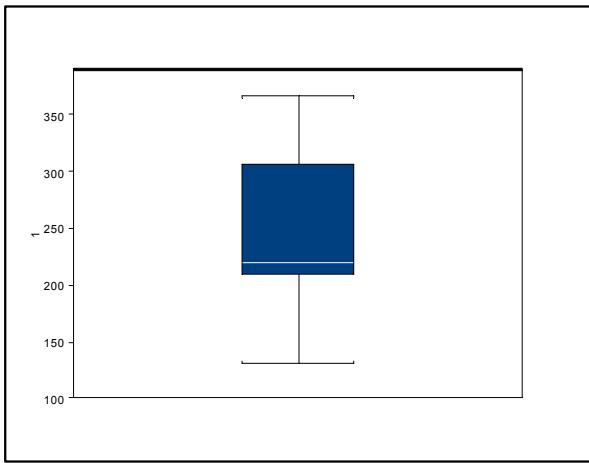


Figure E-39. Boxplot for ^{234}U data.

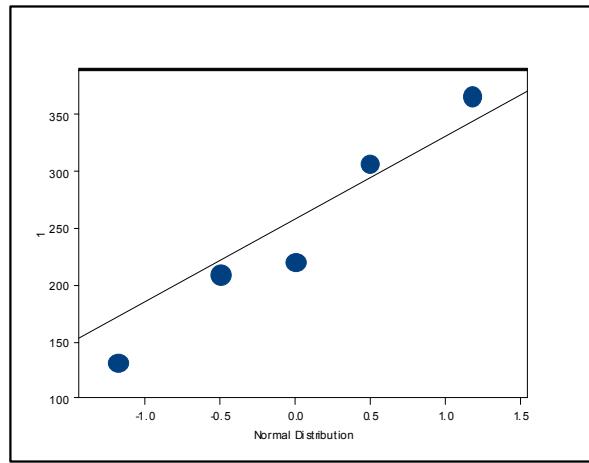
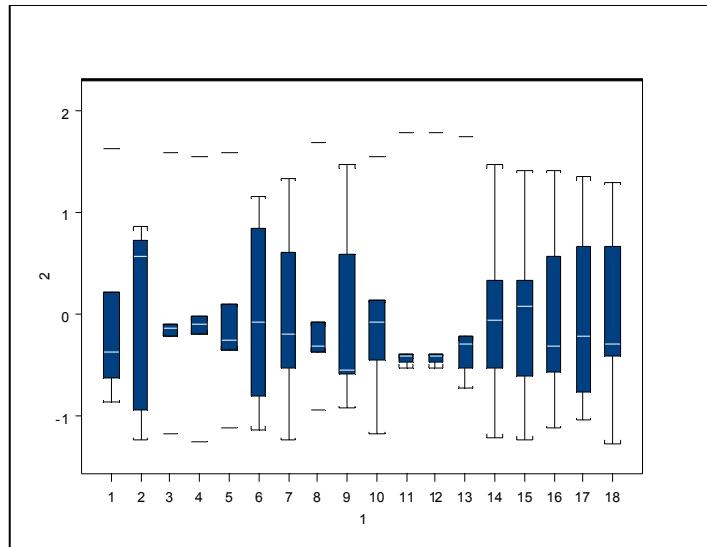


Figure E-40. Normal-quantile plot for ^{234}U data.



Radionuclide	Number
²⁴¹ Am	1
⁶⁰ Co	2
¹³⁴ Cs	3
¹³⁷ Cs	4
¹⁵⁴ Eu	5
³ H	6
¹²⁹ I	7
⁹⁴ Nb	8
⁶³ Ni	9
²³⁷ Np	10
²³⁸ Pu	11
^{239/240} Pu	12
^{239/240} Pu ($\ln[\ln x]$ transformation)	13
²⁴¹ Pu	14
¹²⁵ Sb	15
⁹⁹ Tc-99 ICP-MS	16
Total Sr (⁹⁰ Sr)	17
²³⁴ U	18

Figure E-41. Grouped boxplots of radionuclide data. Data have been standardized so that distributions are directly comparable.

Appendix F

Reported Results for Metals

Table F-1. Reported results for metals.

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101XM	WM-184 TR-55	3CD21	Metals	7429-90-5	Aluminum	3.23E+03	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7429-90-5	Aluminum	3.06E+03	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7429-90-5	Aluminum	3.52E+03	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7429-90-5	Aluminum	2.40E+03	µg/L		
CP10110501XM	WM-184 TR-58	3CD46	Metals	7429-90-5	Aluminum	2.84E+03	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-36-0	Antimony	6.50E+00	µg/L	U	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-36-0	Antimony	6.50E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-36-0	Antimony	6.50E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-36-0	Antimony	6.50E+00	µg/L	U	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-36-0	Antimony	6.50E+00	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-38-2	Arsenic	4.70E+00	µg/L	U	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-38-2	Arsenic	4.70E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-38-2	Arsenic	4.70E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-38-2	Arsenic	4.70E+00	µg/L	U	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-38-2	Arsenic	4.70E+00	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-39-3	Barium	1.00E+00	µg/L	B	U
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-39-3	Barium	1.10E+00	µg/L	B	U
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-39-3	Barium	9.00E-01	µg/L	B	U
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-39-3	Barium	1.10E+00	µg/L	B	U
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-39-3	Barium	1.30E+00	µg/L	B	U
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-41-7	Beryllium	2.00E-01	µg/L	U	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-41-7	Beryllium	2.00E-01	µg/L	U	

F-3

Table F-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-41-7	Beryllium	2.00E-01	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-41-7	Beryllium	2.00E-01	µg/L	U	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-41-7	Beryllium	2.00E-01	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-43-9	Cadmium	5.80E+00	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-43-9	Cadmium	5.50E+00	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-43-9	Cadmium	6.30E+00	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-43-9	Cadmium	4.10E+00	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-43-9	Cadmium	5.20E+00	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-70-2	Calcium	1.73E+02	µg/L	B	U
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-70-2	Calcium	1.63E+02	µg/L	B	U
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-70-2	Calcium	1.99E+02	µg/L	B	U
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-70-2	Calcium	1.17E+02	µg/L	B	U
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-70-2	Calcium	1.32E+02	µg/L	B	U
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-47-3	Chromium	4.30E+01	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-47-3	Chromium	2.52E+01	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-47-3	Chromium	2.97E+01	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-47-3	Chromium	2.00E+01	µg/L		
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-47-3	Chromium	2.46E+01	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-48-4	Cobalt	2.00E+00	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-48-4	Cobalt	1.20E+00	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-48-4	Cobalt	1.20E+00	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-48-4	Cobalt	1.40E+00	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-48-4	Cobalt	2.20E+00	µg/L	B	

F-4

Table F-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-50-8	Copper	1.24E+01	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-50-8	Copper	7.00E+00	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-50-8	Copper	1.73E+01	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-50-8	Copper	8.20E+00	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-50-8	Copper	1.14E+01	µg/L	B	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-89-6	Iron	1.68E+03	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-89-6	Iron	4.65E+02	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-89-6	Iron	8.80E+02	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-89-6	Iron	1.09E+03	µg/L		
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-89-6	Iron	1.70E+03	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-92-1	Lead	1.28E+01	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-92-1	Lead	3.70E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-92-1	Lead	3.70E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-92-1	Lead	5.80E+00	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-92-1	Lead	1.19E+01	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-95-4	Magnesium	5.14E+01	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-95-4	Magnesium	4.42E+01	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-95-4	Magnesium	5.24E+01	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-95-4	Magnesium	4.35E+01	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-95-4	Magnesium	4.16E+01	µg/L	B	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-96-5	Manganese	7.74E+01	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-96-5	Manganese	7.15E+01	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-96-5	Manganese	8.16E+01	µg/L		

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Table F-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-96-5	Manganese	5.51E+01	µg/L		
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-96-5	Manganese	6.33E+01	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-97-6	Mercury	7.96E+01	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-97-6	Mercury	8.08E+01	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-97-6	Mercury	1.02E+02	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-97-6	Mercury	6.34E+01	µg/L		
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-97-6	Mercury	7.40E+01	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7439-98-7	Molybdenum	1.36E+01	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7439-98-7	Molybdenum	4.80E+00	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7439-98-7	Molybdenum	8.90E+00	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7439-98-7	Molybdenum	8.80E+00	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7439-98-7	Molybdenum	1.34E+01	µg/L	B	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-02-0	Nickel	3.58E+01	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-02-0	Nickel	2.13E+01	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-02-0	Nickel	2.42E+01	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-02-0	Nickel	1.84E+01	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-02-0	Nickel	2.18E+01	µg/L	B	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-09-7	Potassium	6.23E+02	µg/L	B	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-09-7	Potassium	5.91E+02	µg/L	B	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-09-7	Potassium	7.27E+02	µg/L	B	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-09-7	Potassium	4.79E+02	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-09-7	Potassium	5.18E+02	µg/L	B	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7782-49-2	Selenium	4.90E+00	µg/L	U	

F-6

Table F-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110201XM	WM-184 TR-57	3CD28	Metals	7782-49-2	Selenium	4.90E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7782-49-2	Selenium	4.90E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7782-49-2	Selenium	4.90E+00	µg/L	U	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7782-49-2	Selenium	4.90E+00	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-22-4	Silver	3.08E+02	µg/L	J	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-22-4	Silver	1.50E+02	µg/L	J	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-22-4	Silver	2.16E+02	µg/L	J	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-22-4	Silver	1.82E+02	µg/L	J	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-22-4	Silver	2.81E+02	µg/L	J	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-23-5	Sodium	6.08E+03	µg/L		
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-23-5	Sodium	6.17E+03	µg/L		
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-23-5	Sodium	6.93E+03	µg/L		
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-23-5	Sodium	4.56E+03	µg/L	B	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-23-5	Sodium	5.08E+03	µg/L		
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-28-0	Thallium	4.90E+00	µg/L	U	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-28-0	Thallium	4.90E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-28-0	Thallium	4.90E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-28-0	Thallium	4.90E+00	µg/L	U	
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-28-0	Thallium	4.90E+00	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-62-2	Vanadium	2.80E+00	µg/L	U	
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-62-2	Vanadium	2.80E+00	µg/L	U	
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-62-2	Vanadium	2.80E+00	µg/L	U	
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-62-2	Vanadium	2.80E+00	µg/L	U	

F-7

Table F-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-62-2	Vanadium	2.80E+00	µg/L	U	
CP10110101XM	WM-184 TR-55	3CD21	Metals	7440-66-6	Zinc	2.28E+01	µg/L		U
CP10110201XM	WM-184 TR-57	3CD28	Metals	7440-66-6	Zinc	2.07E+01	µg/L		U
CP10110301XM	WM-184 TR-58	3CD34	Metals	7440-66-6	Zinc	3.19E+01	µg/L		U
CP10110401XM	WM-184 TR-57	3CD40	Metals	7440-66-6	Zinc	1.63E+01	µg/L	B	U
CP10110501XM	WM-184 TR-58	3CD46	Metals	7440-66-6	Zinc	2.06E+01	µg/L		U

a. Laboratory flags:

B=Analyte was below the required detection limit but greater than or equal to the instrument detection limit

U=Analyte was analyzed for but not detected.

b. Validator flags:

J=Estimated

U=Undetected.

Appendix G

Reported Results for pH and Anions

Table G-1. Reported results for pH and anions.

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101AN	WM-184 TR-55	3CD22	Miscellaneous	16887-00-6	Chloride	2.78	mg/L		
CP10110201AN	WM-184 TR-57	3CD29	Miscellaneous	16887-00-6	Chloride	2.77	mg/L		
CP10110301AN	WM-184 TR-58	3CD35	Miscellaneous	16887-00-6	Chloride	2.67	mg/L		
CP10110401AN	WM-184 TR-58	3CD41	Miscellaneous	16887-00-6	Chloride	2.36	mg/L		
CP10110501AN	WM-184 TR-58	3CD47	Miscellaneous	16887-00-6	Chloride	3.00	mg/L		
CP10110101AN	WM-184 TR-55	3CD22	Miscellaneous	16984-48-8	Fluoride	0.43	mg/L	N	J
CP10110201AN	WM-184 TR-57	3CD29	Miscellaneous	16984-48-8	Fluoride	0.50	mg/L	N	J
CP10110301AN	WM-184 TR-58	3CD35	Miscellaneous	16984-48-8	Fluoride	0.99	mg/L	N	J
CP10110401AN	WM-184 TR-58	3CD41	Miscellaneous	16984-48-8	Fluoride	0.35	mg/L	N	J
CP10110501AN	WM-184 TR-58	3CD47	Miscellaneous	16984-48-8	Fluoride	0.71	mg/L	N	J
CP10110101AN	WM-184 TR-55	3CD22	Miscellaneous	*Nitrate	Nitrate	11.4	mg-N/L		
CP10110201AN	WM-184 TR-57	3CD29	Miscellaneous	*Nitrate	Nitrate	11.5	mg-N/L		
CP10110301AN	WM-184 TR-58	3CD35	Miscellaneous	*Nitrate	Nitrate	12.5	mg-N/L		
CP10110401AN	WM-184 TR-58	3CD41	Miscellaneous	*Nitrate	Nitrate	8.43	mg-N/L		
CP10110501AN	WM-184 TR-58	3CD47	Miscellaneous	*Nitrate	Nitrate	9.06	mg-N/L		
CP10110101PH	WM-184 TR-55	3CD23	Miscellaneous	*pH	pH	3.5	N/A		
CP10110201PH	WM-184 TR-57	3CD30	Miscellaneous	*pH	pH	3.5	N/A		
CP10110301PH	WM-184 TR-58	3CD36	Miscellaneous	*pH	pH	3.5	N/A		
CP10110401PH	WM-184 TR-58	3CD42	Miscellaneous	*pH	pH	3.6	N/A		
CP10110501PH	WM-184 TR-58	3CD48	Miscellaneous	*pH	pH	3.5	N/A		
CP10110101AN	WM-184 TR-55	3CD22	Miscellaneous	*Phosphate	Phosphate	0.042	mg-P/L	U	
CP10110201AN	WM-184 TR-57	3CD29	Miscellaneous	*Phosphate	Phosphate	0.042	mg-P/L	U	
CP10110301AN	WM-184 TR-58	3CD35	Miscellaneous	*Phosphate	Phosphate	0.042	mg-P/L	U	
CP10110401AN	WM-184 TR-58	3CD41	Miscellaneous	*Phosphate	Phosphate	0.076	mg-P/L	J	
CP10110501AN	WM-184 TR-58	3CD47	Miscellaneous	*Phosphate	Phosphate	0.12	mg-P/L	J	

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101AN	WM-184 TR-55	3CD22	Miscellaneous	14808-79-8	Sulfate	1.58	mg/L		
CP10110201AN	WM-184 TR-57	3CD29	Miscellaneous	14808-79-8	Sulfate	1.55	mg/L		
CP10110301AN	WM-184 TR-58	3CD35	Miscellaneous	14808-79-8	Sulfate	1.65	mg/L		
CP10110401AN	WM-184 TR-58	3CD41	Miscellaneous	14808-79-8	Sulfate	1.17	mg/L		
CP10110501AN	WM-184 TR-58	3CD47	Miscellaneous	14808-79-8	Sulfate	1.16	mg/L		

a. Laboratory flags:
J=Estimated value. Estimated values are less than five times the method detection limit for this analyte.
N=Analytical spike failed.
U=Undetected.

b. Validator flags:
J=Estimated value.

Appendix H

Reported Results for Organics

Table H-1. Reported results for organics.

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	12674-11-2	Aroclor-1016	1.1	µg/L	U	UJ
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	12674-11-2	Aroclor-1016	1.1	µg/L	U	UJ
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	12674-11-2	Aroclor-1016	1.1	µg/L	U	UJ
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	12674-11-2	Aroclor-1016	1.1	µg/L	U	UJ
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	12674-11-2	Aroclor-1016	1.1	µg/L	U	UJ
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	11104-28-2	Aroclor-1221	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	11104-28-2	Aroclor-1221	1.1	µg/L	U	
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	11104-28-2	Aroclor-1221	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	11104-28-2	Aroclor-1221	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	11104-28-2	Aroclor-1221	1.1	µg/L	U	
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	11141-16-5	Aroclor-1232	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	11141-16-5	Aroclor-1232	1.1	µg/L	U	
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	11141-16-5	Aroclor-1232	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	11141-16-5	Aroclor-1232	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	11141-16-5	Aroclor-1232	1.1	µg/L	U	
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	53469-21-9	Aroclor-1242	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	53469-21-9	Aroclor-1242	1.1	µg/L	U	
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	53469-21-9	Aroclor-1242	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	53469-21-9	Aroclor-1242	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	53469-21-9	Aroclor-1242	1.1	µg/L	U	
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	12672-29-6	Aroclor-1248	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	12672-29-6	Aroclor-1248	1.1	µg/L	U	
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	12672-29-6	Aroclor-1248	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	12672-29-6	Aroclor-1248	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	12672-29-6	Aroclor-1248	1.1	µg/L	U	
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	11097-69-1	Aroclor-1254	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	11097-69-1	Aroclor-1254	1.1	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	11097-69-1	Aroclor-1254	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	11097-69-1	Aroclor-1254	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	11097-69-1	Aroclor-1254	1.1	µg/L	U	
CP10110101PC	WM-184 TR-55	0312019-10A	PCB	11096-82-5	Aroclor-1260	1.1	µg/L	U	
CP10110201PC	WM-184 TR-57	0312019-12A	PCB	11096-82-5	Aroclor-1260	1.1	µg/L	U	
CP10110301PC	WM-184 TR-58	0312019-13A	PCB	11096-82-5	Aroclor-1260	1.1	µg/L	U	
CP10110401PC	WM-184 TR-58	0312019-25A	PCB	11096-82-5	Aroclor-1260	1.1	µg/L	U	
CP10110501PC	WM-184 TR-58	0312019-26A	PCB	11096-82-5	Aroclor-1260	1.1	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	92-52-4	1,1'-Biphenyl	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	92-52-4	1,1'-Biphenyl	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	92-52-4	1,1'-Biphenyl	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	92-52-4	1,1'-Biphenyl	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	92-52-4	1,1'-Biphenyl	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	108-60-1	2,2'-oxybis(1-Chloropropane)	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	108-60-1	2,2'-oxybis(1-Chloropropane)	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	108-60-1	2,2'-oxybis(1-Chloropropane)	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	108-60-1	2,2'-oxybis(1-Chloropropane)	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	108-60-1	2,2'-oxybis(1-Chloropropane)	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	95-95-4	2,4,5-Trichlorophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	95-95-4	2,4,5-Trichlorophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	95-95-4	2,4,5-Trichlorophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	95-95-4	2,4,5-Trichlorophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	95-95-4	2,4,5-Trichlorophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	88-06-2	2,4,6-Trichlorophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	88-06-2	2,4,6-Trichlorophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	88-06-2	2,4,6-Trichlorophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	88-06-2	2,4,6-Trichlorophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	88-06-2	2,4,6-Trichlorophenol	10.4	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	120-83-2	2,4-Dichlorophenol	10	µg/L	U	H-5
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	120-83-2	2,4-Dichlorophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	120-83-2	2,4-Dichlorophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	120-83-2	2,4-Dichlorophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	120-83-2	2,4-Dichlorophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	105-67-9	2,4-Dimethylphenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	105-67-9	2,4-Dimethylphenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	105-67-9	2,4-Dimethylphenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	105-67-9	2,4-Dimethylphenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	105-67-9	2,4-Dimethylphenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	51-28-5	2,4-Dinitrophenol	15.7	µg/L	J	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	51-28-5	2,4-Dinitrophenol	15.3	µg/L	J	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	51-28-5	2,4-Dinitrophenol	21	µg/L	J	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	51-28-5	2,4-Dinitrophenol	16.1	µg/L	J	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	51-28-5	2,4-Dinitrophenol	16.1	µg/L	J	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	121-14-2	2,4-Dinitrotoluene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	121-14-2	2,4-Dinitrotoluene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	121-14-2	2,4-Dinitrotoluene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	121-14-2	2,4-Dinitrotoluene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	121-14-2	2,4-Dinitrotoluene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	606-20-2	2,6-Dinitrotoluene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	606-20-2	2,6-Dinitrotoluene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	606-20-2	2,6-Dinitrotoluene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	606-20-2	2,6-Dinitrotoluene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	606-20-2	2,6-Dinitrotoluene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	91-58-7	2-Chloronaphthalene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	91-58-7	2-Chloronaphthalene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	91-58-7	2-Chloronaphthalene	10.3	µg/L	U	

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	91-58-7	2-Chloronaphthalene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	91-58-7	2-Chloronaphthalene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	95-57-8	2-Chlorophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	95-57-8	2-Chlorophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	95-57-8	2-Chlorophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	95-57-8	2-Chlorophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	95-57-8	2-Chlorophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	91-57-6	2-Methylnaphthalene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	91-57-6	2-Methylnaphthalene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	91-57-6	2-Methylnaphthalene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	91-57-6	2-Methylnaphthalene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	91-57-6	2-Methylnaphthalene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	95-48-7	2-Methylphenol (o-Cresol)	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	95-48-7	2-Methylphenol (o-Cresol)	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	95-48-7	2-Methylphenol (o-Cresol)	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	95-48-7	2-Methylphenol (o-Cresol)	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	95-48-7	2-Methylphenol (o-Cresol)	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	88-74-4	2-Nitroaniline	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	88-74-4	2-Nitroaniline	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	88-74-4	2-Nitroaniline	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	88-74-4	2-Nitroaniline	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	88-74-4	2-Nitroaniline	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	88-75-5	2-Nitrophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	88-75-5	2-Nitrophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	88-75-5	2-Nitrophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	88-75-5	2-Nitrophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	88-75-5	2-Nitrophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	91-94-1	3,3'-Dichlorobenzidine	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	91-94-1	3,3'-Dichlorobenzidine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	91-94-1	3,3'-Dichlorobenzidine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	91-94-1	3,3'-Dichlorobenzidine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	91-94-1	3,3'-Dichlorobenzidine	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	99-09-2	3-Nitroaniline	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	99-09-2	3-Nitroaniline	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	99-09-2	3-Nitroaniline	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	99-09-2	3-Nitroaniline	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	99-09-2	3-Nitroaniline	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	534-52-1	4,6-Dinitro-2-methylphenol	10	µg/L	U	UJ
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	534-52-1	4,6-Dinitro-2-methylphenol	10.5	µg/L	U	UJ
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	534-52-1	4,6-Dinitro-2-methylphenol	10.3	µg/L	U	UJ
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	534-52-1	4,6-Dinitro-2-methylphenol	10.5	µg/L	U	UJ
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	534-52-1	4,6-Dinitro-2-methylphenol	10.4	µg/L	U	UJ
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	101-55-3	4-Bromophenyl phenyl ether	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	101-55-3	4-Bromophenyl phenyl ether	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	101-55-3	4-Bromophenyl phenyl ether	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	101-55-3	4-Bromophenyl phenyl ether	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	101-55-3	4-Bromophenyl phenyl ether	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	59-50-7	4-Chloro-3-methylphenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	59-50-7	4-Chloro-3-methylphenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	59-50-7	4-Chloro-3-methylphenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	59-50-7	4-Chloro-3-methylphenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	59-50-7	4-Chloro-3-methylphenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	106-47-8	4-Chloroaniline	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	106-47-8	4-Chloroaniline	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	106-47-8	4-Chloroaniline	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	106-47-8	4-Chloroaniline	10.5	µg/L	U	

L-H

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	106-47-8	4-Chloroaniline	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	7005-72-3	4-Chlorophenyl phenyl ether	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	7005-72-3	4-Chlorophenyl phenyl ether	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	7005-72-3	4-Chlorophenyl phenyl ether	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	7005-72-3	4-Chlorophenyl phenyl ether	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	7005-72-3	4-Chlorophenyl phenyl ether	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	106-44-5	4-Methylphenol (p-Cresol)	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	106-44-5	4-Methylphenol (p-Cresol)	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	106-44-5	4-Methylphenol (p-Cresol)	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	106-44-5	4-Methylphenol (p-Cresol)	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	106-44-5	4-Methylphenol (p-Cresol)	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	100-01-6	4-Nitroaniline	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	100-01-6	4-Nitroaniline	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	100-01-6	4-Nitroaniline	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	100-01-6	4-Nitroaniline	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	100-01-6	4-Nitroaniline	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	100-02-7	4-Nitrophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	100-02-7	4-Nitrophenol	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	100-02-7	4-Nitrophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	100-02-7	4-Nitrophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	100-02-7	4-Nitrophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	83-32-9	Acenaphthene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	83-32-9	Acenaphthene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	83-32-9	Acenaphthene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	83-32-9	Acenaphthene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	83-32-9	Acenaphthene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	208-96-8	Acenaphthylene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	208-96-8	Acenaphthylene	10.5	µg/L	U	

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	208-96-8	Acenaphthylene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	208-96-8	Acenaphthylene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	208-96-8	Acenaphthylene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	98-86-2	Acetophenone	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	98-86-2	Acetophenone	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	98-86-2	Acetophenone	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	98-86-2	Acetophenone	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	98-86-2	Acetophenone	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	120-12-7	Anthracene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	120-12-7	Anthracene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	120-12-7	Anthracene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	120-12-7	Anthracene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	120-12-7	Anthracene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	1912-24-9	Atrazine	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	1912-24-9	Atrazine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	1912-24-9	Atrazine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	1912-24-9	Atrazine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	1912-24-9	Atrazine	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	100-52-7	Benzaldehyde	10	µg/L	U	UJ
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	100-52-7	Benzaldehyde	10.5	µg/L	U	UJ
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	100-52-7	Benzaldehyde	10.3	µg/L	U	UJ
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	100-52-7	Benzaldehyde	10.5	µg/L	U	UJ
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	100-52-7	Benzaldehyde	10.4	µg/L	U	UJ
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	56-55-3	Benzo(a)anthracene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	56-55-3	Benzo(a)anthracene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	56-55-3	Benzo(a)anthracene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	56-55-3	Benzo(a)anthracene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	56-55-3	Benzo(a)anthracene	10.4	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
H-10	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	50-32-8	Benzo(a)pyrene	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	50-32-8	Benzo(a)pyrene	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	50-32-8	Benzo(a)pyrene	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	50-32-8	Benzo(a)pyrene	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	50-32-8	Benzo(a)pyrene	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	205-99-2	Benzo(b)fluoranthene	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	205-99-2	Benzo(b)fluoranthene	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	205-99-2	Benzo(b)fluoranthene	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	205-99-2	Benzo(b)fluoranthene	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	205-99-2	Benzo(b)fluoranthene	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	191-24-2	Benzo(g,h,i)perylene	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	191-24-2	Benzo(g,h,i)perylene	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	191-24-2	Benzo(g,h,i)perylene	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	191-24-2	Benzo(g,h,i)perylene	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	191-24-2	Benzo(g,h,i)perylene	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	207-08-9	Benzo(k)fluoranthene	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	207-08-9	Benzo(k)fluoranthene	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	207-08-9	Benzo(k)fluoranthene	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	207-08-9	Benzo(k)fluoranthene	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	207-08-9	Benzo(k)fluoranthene	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	111-91-1	bis-(2-chloroethoxy)methane	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	111-91-1	bis-(2-chloroethoxy)methane	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	111-91-1	bis-(2-chloroethoxy)methane	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	111-91-1	bis-(2-chloroethoxy)methane	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	111-91-1	bis-(2-chloroethoxy)methane	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	111-44-4	bis-(2-Chloroethyl)ether	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	111-44-4	bis-(2-Chloroethyl)ether	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	111-44-4	bis-(2-Chloroethyl)ether	10.3	µg/L	U

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	111-44-4	bis-(2-Chloroethyl)ether	10.5	µg/L	U	H-11
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	111-44-4	bis-(2-Chloroethyl)ether	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	117-81-7	bis-(2-ethylhexyl)phthalate	13.1 ^c	µg/L		
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	117-81-7	bis-(2-ethylhexyl)phthalate	6.6 ^c	µg/L	J	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	117-81-7	bis-(2-ethylhexyl)phthalate	10.1 ^c	µg/L	J	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	117-81-7	bis-(2-ethylhexyl)phthalate	14.6 ^c	µg/L		
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	117-81-7	bis-(2-ethylhexyl)phthalate	17.9 ^c	µg/L		
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	85-68-7	Butyl benzyl phthalate	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	85-68-7	Butyl benzyl phthalate	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	85-68-7	Butyl benzyl phthalate	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	85-68-7	Butyl benzyl phthalate	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	85-68-7	Butyl benzyl phthalate	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	105-60-2	Caprolactam	10	µg/L	U	UJ
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	105-60-2	Caprolactam	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	105-60-2	Caprolactam	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	105-60-2	Caprolactam	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	105-60-2	Caprolactam	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	86-74-8	Carbazole	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	86-74-8	Carbazole	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	86-74-8	Carbazole	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	86-74-8	Carbazole	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	86-74-8	Carbazole	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	218-01-9	Chrysene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	218-01-9	Chrysene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	218-01-9	Chrysene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	218-01-9	Chrysene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	218-01-9	Chrysene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	53-70-3	Dibenzo(a,h)anthracene	10	µg/L	U	

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
H-12	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	53-70-3	Dibenzo(a,h)anthracene	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	53-70-3	Dibenzo(a,h)anthracene	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	53-70-3	Dibenzo(a,h)anthracene	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	53-70-3	Dibenzo(a,h)anthracene	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	132-64-9	Dibenzofuran	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	132-64-9	Dibenzofuran	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	132-64-9	Dibenzofuran	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	132-64-9	Dibenzofuran	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	132-64-9	Dibenzofuran	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	84-66-2	Diethyl Phthalate	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	84-66-2	Diethyl Phthalate	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	84-66-2	Diethyl Phthalate	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	84-66-2	Diethyl Phthalate	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	84-66-2	Diethyl Phthalate	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	131-11-3	Dimethyl phthalate	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	131-11-3	Dimethyl phthalate	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	131-11-3	Dimethyl phthalate	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	131-11-3	Dimethyl phthalate	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	131-11-3	Dimethyl phthalate	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	84-74-2	Di-n-butyl phthalate	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	84-74-2	Di-n-butyl phthalate	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	84-74-2	Di-n-butyl phthalate	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	84-74-2	Di-n-butyl phthalate	10.5	µg/L	U
	CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	84-74-2	Di-n-butyl phthalate	10.4	µg/L	U
	CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	117-84-0	Di-n-octyl phthalate	10	µg/L	U
	CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	117-84-0	Di-n-octyl phthalate	10.5	µg/L	U
	CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	117-84-0	Di-n-octyl phthalate	10.3	µg/L	U
	CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	117-84-0	Di-n-octyl phthalate	10.5	µg/L	U

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	117-84-0	Di-n-octyl phthalate	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	206-44-0	Fluoranthene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	206-44-0	Fluoranthene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	206-44-0	Fluoranthene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	206-44-0	Fluoranthene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	206-44-0	Fluoranthene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	86-73-7	Fluorene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	86-73-7	Fluorene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	86-73-7	Fluorene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	86-73-7	Fluorene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	86-73-7	Fluorene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	118-74-1	Hexachlorobenzene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	118-74-1	Hexachlorobenzene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	118-74-1	Hexachlorobenzene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	118-74-1	Hexachlorobenzene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	118-74-1	Hexachlorobenzene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	87-68-3	Hexachlorobutadiene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	87-68-3	Hexachlorobutadiene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	87-68-3	Hexachlorobutadiene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	87-68-3	Hexachlorobutadiene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	87-68-3	Hexachlorobutadiene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	77-47-4	Hexachlorocyclopentadiene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	77-47-4	Hexachlorocyclopentadiene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	77-47-4	Hexachlorocyclopentadiene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	77-47-4	Hexachlorocyclopentadiene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	77-47-4	Hexachlorocyclopentadiene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	67-72-1	Hexachloroethane	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	67-72-1	Hexachloroethane	10.5	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	67-72-1	Hexachloroethane	10.3	µg/L	U	H-14
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	67-72-1	Hexachloroethane	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	67-72-1	Hexachloroethane	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	193-39-5	Indeno(1,2,3-cd)pyrene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	78-59-1	Isophorone	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	78-59-1	Isophorone	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	78-59-1	Isophorone	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	78-59-1	Isophorone	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	78-59-1	Isophorone	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	91-20-3	Naphthalene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	91-20-3	Naphthalene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	91-20-3	Naphthalene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	91-20-3	Naphthalene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	91-20-3	Naphthalene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	98-95-3	Nitrobenzene	10	µg/L	U	H-14
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	98-95-3	Nitrobenzene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	98-95-3	Nitrobenzene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	98-95-3	Nitrobenzene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	98-95-3	Nitrobenzene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	62-75-9	n-Nitrosodimethylamine	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	62-75-9	n-Nitrosodimethylamine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	62-75-9	n-Nitrosodimethylamine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	62-75-9	n-Nitrosodimethylamine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	62-75-9	n-Nitrosodimethylamine	10.4	µg/L	U	

Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	621-64-7	n-Nitrosodi-n-propylamine	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	621-64-7	n-Nitrosodi-n-propylamine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	621-64-7	n-Nitrosodi-n-propylamine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	621-64-7	n-Nitrosodi-n-propylamine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	621-64-7	n-Nitrosodi-n-propylamine	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	86-30-6	n-Nitrosodiphenylamine	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	86-30-6	n-Nitrosodiphenylamine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	86-30-6	n-Nitrosodiphenylamine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	86-30-6	n-Nitrosodiphenylamine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	86-30-6	n-Nitrosodiphenylamine	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	87-86-5	Pentachlorophenol	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	87-86-5	Pentachlorophenol	3.2	µg/L	J	J
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	87-86-5	Pentachlorophenol	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	87-86-5	Pentachlorophenol	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	87-86-5	Pentachlorophenol	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	85-01-8	Phenanthrene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	85-01-8	Phenanthrene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	85-01-8	Phenanthrene	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	85-01-8	Phenanthrene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	85-01-8	Phenanthrene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	108-95-2	Phenol	2.7	µg/L	J	J
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	108-95-2	Phenol	2.8	µg/L	J	J
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	108-95-2	Phenol	3.5	µg/L	J	J
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	108-95-2	Phenol	3.7	µg/L	J	J
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	108-95-2	Phenol	3.1	µg/L	J	J
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	129-00-0	Pyrene	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	129-00-0	Pyrene	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	129-00-0	Pyrene	10.3	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	129-00-0	Pyrene	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	129-00-0	Pyrene	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	110-86-1	Pyridine	10	µg/L	U	
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	110-86-1	Pyridine	10.5	µg/L	U	
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	110-86-1	Pyridine	10.3	µg/L	U	
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	110-86-1	Pyridine	10.5	µg/L	U	
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	110-86-1	Pyridine	10.4	µg/L	U	
CP10110101SV	WM-184 TR-55	0312019-11A	SVOC	126-73-8	Tributyl phosphate	811	µg/L	DE	J
CP10110201SV	WM-184 TR-57	0312019-06A	SVOC	126-73-8	Tributyl phosphate	900	µg/L	DE	J
CP10110301SV	WM-184 TR-58	0312019-07A	SVOC	126-73-8	Tributyl phosphate	985	µg/L	DE	J
CP10110401SV	WM-184 TR-58	0312019-08A	SVOC	126-73-8	Tributyl phosphate	871	µg/L	DE	J
CP10110501SV	WM-184 TR-58	0312019-09A	SVOC	126-73-8	Tributyl phosphate	789	µg/L	D	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	71-55-6	1,1,1-Trichloroethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	79-34-5	1,1,2,2-Tetrachloroethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	79-00-5	1,1,2-Trichloroethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-35-4	1,1-Dichloroethene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	120-82-1	1,2,4-Trichlorobenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	96-12-8	1,2-Dibromo-3-chloropropane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	106-93-4	1,2-Dibromoethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	95-50-1	1,2-Dichlorobenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	78-87-5	1,2-Dichloropropane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	541-73-1	1,3-Dichlorobenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	106-46-7	1,4-Dichlorobenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	78-93-3	2-Butanone	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	78-93-3	2-Butanone	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	78-93-3	2-Butanone	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	78-93-3	2-Butanone	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	78-93-3	2-Butanone	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	78-93-3	2-Butanone	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	591-78-6	2-Hexanone	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	108-10-1	4-Methyl-2-pentanone	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	67-64-1	Acetone	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	71-43-2	Benzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-27-4	Bromodichloromethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-25-2	Bromoform	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	74-83-9	Bromomethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-15-0	Carbon disulfide	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	56-23-5	Carbon tetrachloride	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	108-90-7	Chlorobenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-00-3	Chloroethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	67-66-3	Chloroform	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	74-87-3	Chloromethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	156-59-2	cis-1,2-Dichloroethene	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	10061-01-5	cis-1,3-Dichloropropene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	110-82-7	Cyclohexane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110601VG	Trip Blank	0312019-19A	VOC	108-94-1	Cyclohexanone	10	µg/L	U	R
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	124-48-1	Dibromochloromethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-71-8	Dichlorodifluoromethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	141-78-6	Ethyl acetate	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	100-41-4	Ethylbenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	76-13-1	Freon 113	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	98-82-8	Isopropylbenzene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	13-302-07	m,p-Xylenes	10	µg/L	U	
CP10110101MT	WM-184 TR-55	0312019-20A	VOC	67-56-1	Methanol	20	mg/L	U	
CP10110201MT	WM-184 TR-57	0312019-21A	VOC	67-56-1	Methanol	20	mg/L	U	
CP10110301MT	WM-184 TR-58	0312019-22A	VOC	67-56-1	Methanol	20	mg/L	U	
CP10110401MT	WM-184 TR-58	0312019-23A	VOC	67-56-1	Methanol	20	mg/L	U	
CP10110501MT	WM-184 TR-58	0312019-24A	VOC	67-56-1	Methanol	20	mg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	79-20-9	Methyl acetate	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	108-87-2	Methyl cyclohexane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-09-2	Methylene Chloride	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	95-47-6	o-Xylene	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	95-47-6	o-Xylene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	95-47-6	o-Xylene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	95-47-6	o-Xylene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	95-47-6	o-Xylene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	95-47-6	o-Xylene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	100-42-5	Styrene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	127-18-4	Tetrachloroethene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	108-88-3	Toluene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110601VG	Trip Blank	0312019-19A	VOC	156-60-5	trans-1,2-Dichloroethene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	10061-02-6	trans-1,3-Dichloropropene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	79-01-6	Trichloroethene	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-69-4	Trichlorofluoromethane	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	75-01-4	Vinyl Chloride	10	µg/L	U	
CP10110101VG	WM-184 TR-55	0312019-14A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	
CP10110201VG	WM-184 TR-57	0312019-15A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	
CP10110301VG	WM-184 TR-58	0312019-16A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	

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Table H-1. (continued).

Field Sample ID	Location	Lab Sample ID	Type	CAS-Number	Compound	Result	Units	Lab Flag ^a	Validator Flag ^b
CP10110401VG	WM-184 TR-58	0312019-17A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	
CP10110501VG	WM-184 TR-58	0312019-18A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	
CP10110601VG	Trip Blank	0312019-19A	VOC	1330-20-7	Xylene (Total)	10	µg/L	U	

a. Laboratory flags:

D=Sample was reanalyzed at a higher dilution.

E=Concentration exceeds upper limit of calibration.

J=Analyte was detected but was less than the quantitation limit.

U=Analyte was not detected. Quantitation limit is reported.

b. Validator flags:

J=Estimated

R=Rejected

U=Undetected.

c. Reported results for this compound were deemed highly suspect and not used in this DQA. Phthalates are ubiquitous in nature and low levels are commonly assumed to be associated with laboratory contamination.

Appendix I

Reported Results for Radionuclides

Table I-1. Reported results for radionuclides.

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110101X3	WM-184 TR-55	3CD24	Gamma	^{108m} Ag	2.15E+03	pCi/L	4.27E+02		1.84E+03	9.20E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	^{108m} Ag	3.97E-02	pCi/L	2.75E+02	U	1.08E+03	5.40E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	^{108m} Ag	-6.36E+02	pCi/L	1.01E+03	U	1.53E+03	7.65E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	^{108m} Ag	5.03E+02	pCi/L	6.96E+02	U	1.55E+03	7.75E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	^{108m} Ag	-2.11E+03	pCi/L	2.76E+03	U	2.13E+03	1.07E+03
CP10110101X3	WM-184 TR-55	3CD24	Gamma	^{110m} Ag	1.74E+02	pCi/L	3.59E+02	U	7.81E+02	3.91E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	^{110m} Ag	-8.08E+01	pCi/L	1.64E+02	U	3.51E+02	1.76E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	^{110m} Ag	-8.09E+01	pCi/L	2.42E+02	U	6.99E+02	3.50E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	^{110m} Ag	4.69E+01	pCi/L	2.19E+02	U	7.52E+02	3.76E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	^{110m} Ag	-3.52E+02	pCi/L	6.88E+02	U	1.41E+03	7.05E+02
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²⁴¹ Am	1.66E+04	pCi/L	2.86E+03		1.16E+02	5.80E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²⁴¹ Am	1.01E+04	pCi/L	1.86E+03		1.46E+02	7.30E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²⁴¹ Am	2.73E+04	pCi/L	4.47E+03		1.44E+02	7.20E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²⁴¹ Am	8.28E+03	pCi/L	1.54E+03		4.94E+01	2.47E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²⁴¹ Am	1.21E+04	pCi/L	2.32E+03		2.56E+02	1.28E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	²⁴¹ Am	1.19E+05	pCi/L	8.59E+03		7.06E+03	3.53E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	²⁴¹ Am	6.68E+04	pCi/L	4.70E+03		4.88E+03	2.44E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	²⁴¹ Am	1.36E+05	pCi/L	9.43E+03		6.57E+03	3.29E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	²⁴¹ Am	1.69E+05	pCi/L	1.18E+04		6.82E+03	3.41E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	²⁴¹ Am	2.87E+05	pCi/L	1.85E+04		9.19E+03	4.60E+03
CP10110101X5	WM-184 TR-55	01TP-01-A	Special	¹⁴ C	-3.84E+00	pCi/L	4.76E+00	U	1.59E+01	7.95E+00
CP10110201X5	WM-184 TR-57	01TP-02-A	Special	¹⁴ C	-7.53E+00	pCi/L	4.73E+00	U	1.59E+01	7.95E+00
CP10110301X5	WM-184 TR-58	01TP-03-A	Special	¹⁴ C	-3.46E+00	pCi/L	4.75E+00	U	1.59E+01	7.95E+00
CP10110401X5	WM-184 TR-58	01TP-04-A	Special	¹⁴ C	-1.37E+01	pCi/L	4.72E+00	U	1.59E+01	7.95E+00
CP10110501X5	WM-184 TR-58	01TP-05-A	Special	¹⁴ C	-1.23E+01	pCi/L	4.72E+00	U	1.59E+01	7.95E+00

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁴⁴ Ce	1.68E+03	pCi/L	3.51E+03	U	7.32E+03	3.66E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁴⁴ Ce	9.86E+02	pCi/L	2.26E+03	U	5.14E+03	2.57E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁴⁴ Ce	-1.23E+03	pCi/L	2.93E+03	U	6.89E+03	3.45E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁴⁴ Ce	-6.12E+02	pCi/L	2.34E+03	U	7.23E+03	3.62E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁴⁴ Ce	-2.12E+03	pCi/L	4.49E+03	U	9.45E+03	4.73E+03
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²⁴² Cm	0.00E+00	pCi/L	0.00E+00	U	5.01E+01	2.51E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²⁴² Cm	0.00E+00	pCi/L	0.00E+00	U	5.40E+01	2.70E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²⁴² Cm	0.00E+00	pCi/L	0.00E+00	U	4.95E+01	2.48E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²⁴² Cm	0.00E+00	pCi/L	0.00E+00	U	5.40E+01	2.70E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²⁴² Cm	0.00E+00	pCi/L	0.00E+00	U	4.89E+01	2.45E+01
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²⁴⁴ Cm	0.00E+00	pCi/L	0.00E+00	U	5.01E+01	2.51E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²⁴⁴ Cm	0.00E+00	pCi/L	0.00E+00	U	5.40E+01	2.70E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²⁴⁴ Cm	1.83E+01	pCi/L	2.80E+01	U	4.95E+01	2.48E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²⁴⁴ Cm	1.99E+01	pCi/L	3.06E+01	U	5.40E+01	2.70E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²⁴⁴ Cm	0.00E+00	pCi/L	0.00E+00	U	4.89E+01	2.45E+01
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁵⁸ Co	-5.47E-02	pCi/L	1.62E+02	U	6.38E+02	3.19E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁵⁸ Co	2.93E+01	pCi/L	9.79E+01	U	2.93E+02	1.47E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁵⁸ Co	-3.24E+02	pCi/L	4.73E+02	U	5.77E+02	2.89E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁵⁸ Co	-9.02E+01	pCi/L	2.45E+02	U	6.53E+02	3.27E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁵⁸ Co	-5.91E-02	pCi/L	3.05E+02	UJ	1.20E+03	6.00E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁶⁰ Co	9.83E+03	pCi/L	6.04E+02		1.80E+02	9.00E+01
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁶⁰ Co	4.05E+03	pCi/L	2.65E+02		6.96E+01	3.48E+01
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁶⁰ Co	9.02E+03	pCi/L	5.47E+02		1.57E+02	7.85E+01
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁶⁰ Co	4.87E+03	pCi/L	3.28E+02		1.68E+02	8.40E+01
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁶⁰ Co	9.47E+03	pCi/L	6.55E+02		4.01E+02	2.01E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹³⁴ Cs	6.78E+03	pCi/L	5.83E+02		1.24E+03	6.20E+02

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹³⁴ Cs	2.76E+03	pCi/L	2.36E+02		7.66E+02	3.83E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹³⁴ Cs	6.52E+03	pCi/L	6.26E+02		9.33E+02	4.67E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹³⁴ Cs	6.98E+03	pCi/L	9.39E+02		1.11E+03	5.55E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹³⁴ Cs	1.35E+04	pCi/L	1.29E+03	J	1.43E+03	7.15E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹³⁷ Cs	1.71E+07	pCi/L	9.21E+05		1.11E+03	5.55E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹³⁷ Cs	7.80E+06	pCi/L	4.27E+05		6.27E+02	3.14E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹³⁷ Cs	1.58E+07	pCi/L	8.52E+05		1.01E+03	5.05E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹³⁷ Cs	1.65E+07	pCi/L	8.90E+05		1.07E+03	5.35E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹³⁷ Cs	2.91E+07	pCi/L	1.57E+06		1.74E+03	8.70E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁵² Eu	-1.27E+03	pCi/L	2.31E+03	U	4.16E+03	2.08E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁵² Eu	7.21E+02	pCi/L	1.41E+03	U	2.81E+03	1.41E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁵² Eu	6.64E+02	pCi/L	1.61E+03	U	3.92E+03	1.96E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁵² Eu	8.88E+02	pCi/L	1.88E+03	U	4.05E+03	2.03E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁵² Eu	-3.96E+02	pCi/L	1.68E+03	U	5.46E+03	2.73E+03
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁵⁴ Eu	1.80E+04	pCi/L	1.42E+03		1.04E+03	5.20E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁵⁴ Eu	1.07E+04	pCi/L	9.72E+02		4.43E+02	2.22E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁵⁴ Eu	1.88E+04	pCi/L	1.72E+03		9.06E+02	4.53E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁵⁴ Eu	2.22E+04	pCi/L	1.93E+03		9.81E+02	4.91E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁵⁴ Eu	3.62E+04	pCi/L	3.23E+03		1.93E+03	9.65E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁵⁵ Eu	4.45E+03	pCi/L	1.16E+03		4.89E+03	2.45E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁵⁵ Eu	1.06E-01	pCi/L	7.07E+02	U	2.79E+03	1.40E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁵⁵ Eu	3.93E+03	pCi/L	2.54E+03	U	4.12E+03	2.06E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁵⁵ Eu	3.30E+03	pCi/L	9.16E+02		3.39E+03	1.70E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁵⁵ Eu	4.99E+03	pCi/L	6.59E+03	UJ	5.04E+03	2.52E+03
CP10110101R8	WM-184 TR-55	3CD25	Special	³ H	4.52E+03	pCi/L	4.85E+01	J	5.11E+02	2.56E+02
CP10110201R8	WM-184 TR-57	3CD32	Special	³ H	5.13E+03	pCi/L	5.16E+01	J	5.19E+02	2.60E+02

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110301R8	WM-184 TR-58	3CD38	Special	³ H	4.97E+03	pCi/L	4.99E+01	J	5.12E+02	2.56E+02
CP10110401R8	WM-184 TR-58	3CD44	Special	³ H	4.01E+03	pCi/L	4.80E+01	J	5.16E+02	2.58E+02
CP10110501R8	WM-184 TR-58	3CD50	Special	³ H	4.17E+03	pCi/L	4.85E+01	J	5.16E+02	2.58E+02
CP10110101X5	WM-184 TR-55	01TP-01-A	Special	¹²⁹ I	5.88E+01	pCi/L	5.40E+00	J	9.83E+00	4.92E+00
CP10110201X5	WM-184 TR-57	01TP-02-A	Special	¹²⁹ I	6.62E+01	pCi/L	5.49E+00		8.71E+00	4.36E+00
CP10110301X5	WM-184 TR-58	01TP-03-A	Special	¹²⁹ I	7.78E+01	pCi/L	6.63E+00		1.10E+01	5.50E+00
CP10110401X5	WM-184 TR-58	01TP-04-A	Special	¹²⁹ I	6.95E+01	pCi/L	6.97E+00		1.40E+01	7.00E+00
CP10110501X5	WM-184 TR-58	01TP-05-A	Special	¹²⁹ I	8.54E+01	pCi/L	7.50E+00		1.29E+01	6.45E+00
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁵⁴ Mn	2.51E+02	pCi/L	4.05E+02	U	6.19E+02	3.10E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁵⁴ Mn	-3.94E+01	pCi/L	1.05E+02	U	2.81E+02	1.41E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁵⁴ Mn	5.79E+01	pCi/L	1.87E+02	U	5.55E+02	2.78E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁵⁴ Mn	2.67E+01	pCi/L	1.64E+02	U	5.95E+02	2.98E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁵⁴ Mn	-2.53E+02	pCi/L	5.17E+02	U	1.10E+03	5.50E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁹⁴ Nb	1.03E+04	pCi/L	8.56E+02		7.46E+02	3.73E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁹⁴ Nb	4.48E+03	pCi/L	4.67E+02		3.36E+02	1.68E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁹⁴ Nb	1.08E+04	pCi/L	8.05E+02		6.62E+02	3.31E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁹⁴ Nb	1.32E+04	pCi/L	9.93E+02		7.02E+02	3.51E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁹⁴ Nb	3.10E+04	pCi/L	2.85E+03		1.39E+03	6.95E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁹⁵ Nb	-4.33E+02	pCi/L	6.07E+02	U	6.56E+02	3.28E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁹⁵ Nb	-8.30E+01	pCi/L	1.58E+02	U	3.06E+02	1.53E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁹⁵ Nb	-1.71E+02	pCi/L	3.21E+02	U	6.06E+02	3.03E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁹⁵ Nb	6.20E+02 ^d	pCi/L	9.87E+01		6.13E+02	3.07E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁹⁵ Nb	1.46E+02	pCi/L	4.64E+02	U	1.34E+03	6.70E+02
CP10110101X4	WM-184 TR-55	0312019-01	Special	⁶³ Ni	1.91E+03	pCi/L	1.64E+02	J	4.69E+01	2.35E+01
CP10110201X4	WM-184 TR-57	0312019-02	Special	⁶³ Ni	1.68E+03	pCi/L	1.45E+02	J	4.61E+01	2.31E+01
CP10110301X4	WM-184 TR-58	0312019-03	Special	⁶³ Ni	2.60E+03	pCi/L	2.21E+02	J	4.91E+01	2.46E+01

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110401X4	WM-184 TR-58	0312019-04	Special	⁶³ Ni	1.89E+03	pCi/L	1.63E+02	J	5.16E+01	2.58E+01
CP10110501X4	WM-184 TR-58	0312019-05	Special	⁶³ Ni	3.14E+03	pCi/L	2.66E+02	J	5.10E+01	2.55E+01
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²³⁷ Np	8.06E+02	pCi/L	1.06E+02		7.03E+01	3.52E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²³⁷ Np	1.20E+03	pCi/L	1.66E+02		4.71E+01	2.36E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁷ Np	1.06E+03	pCi/L	1.54E+02		6.97E+01	3.49E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁷ Np	2.14E+03	pCi/L	2.34E+02		9.96E+01	4.98E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁷ Np	3.14E+02	pCi/L	5.69E+01		6.60E+01	3.30E+01
CP10110101X4	WM-184 TR-55	0312019-01	Special	²⁴¹ Pu	5.30E+04	pCi/L	1.54E+03	J	1.21E+03	6.05E+02
CP10110201X4	WM-184 TR-57	0312019-02	Special	²⁴¹ Pu	1.79E+06	pCi/L	4.98E+04	J	1.31E+04	6.55E+03
CP10110301X4	WM-184 TR-58	0312019-03	Special	²⁴¹ Pu	2.99E+06	pCi/L	8.29E+04	J	1.15E+04	5.75E+03
CP10110401X4	WM-184 TR-58	0312019-04	Special	²⁴¹ Pu	3.99E+06	pCi/L	1.11E+05	J	1.27E+04	6.35E+03
CP10110501X4	WM-184 TR-58	0312019-05	Special	²⁴¹ Pu	6.90E+06	pCi/L	1.99E+05	J	2.86E+04	1.43E+04
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²³⁸ Pu	6.33E+05	pCi/L	1.04E+05		4.39E+02	2.20E+02
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²³⁸ Pu	4.10E+05	pCi/L	6.85E+04		3.54E+02	1.77E+02
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁸ Pu	4.40E+06	pCi/L	7.16E+05		3.95E+02	1.98E+02
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁸ Pu	4.93E+05	pCi/L	8.21E+04		3.73E+02	1.87E+02
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁸ Pu	5.85E+05	pCi/L	9.63E+04		3.16E+02	1.58E+02
CP10110101X3	WM-184 TR-55	3CD24	Alpha	^{239/240} Pu	1.36E+05	pCi/L	2.32E+04		3.68E+02	1.84E+02
CP10110201X3	WM-184 TR-57	3CD31	Alpha	^{239/240} Pu	8.64E+04	pCi/L	1.52E+04		2.20E+02	1.10E+02
CP10110301X3	WM-184 TR-58	3CD37	Alpha	^{239/240} Pu	8.99E+05	pCi/L	1.49E+05		2.42E+02	1.21E+02
CP10110401X3	WM-184 TR-58	3CD43	Alpha	^{239/240} Pu	1.03E+05	pCi/L	1.79E+04		3.10E+02	1.55E+02
CP10110501X3	WM-184 TR-58	3CD49	Alpha	^{239/240} Pu	1.27E+05	pCi/L	2.18E+04		2.78E+02	1.39E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	²²⁶ Ra	1.63E+06 ^e	pCi/L	2.24E+05		3.93E+04	1.97E+04
CP10110201X3	WM-184 TR-57	3CD31	Gamma	²²⁶ Ra	5.47E+05 ^e	pCi/L	5.61E+04		2.44E+04	1.22E+04
CP10110301X3	WM-184 TR-58	3CD37	Gamma	²²⁶ Ra	1.35E+06 ^e	pCi/L	1.76E+05		3.53E+04	1.77E+04
CP10110401X3	WM-184 TR-58	3CD43	Gamma	²²⁶ Ra	1.33E+06 ^e	pCi/L	1.46E+05		3.59E+04	1.80E+04

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110501X3	WM-184 TR-58	3CD49	Gamma	²²⁶ Ra	2.44E+06 ^e	pCi/L	2.51E+05		4.74E+04	2.37E+04
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁰³ Ru	-3.07E+02	pCi/L	6.45E+02	U	1.43E+03	7.15E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁰³ Ru	3.16E+03 ^d	pCi/L	6.91E+02		1.18E+03	5.90E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁰³ Ru	-1.41E+01	pCi/L	3.21E+02	U	1.38E+03	6.90E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁰³ Ru	-7.63E+02	pCi/L	1.17E+03	U	1.59E+03	7.95E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁰³ Ru	-3.10E+02	pCi/L	8.21E+02	U	2.21E+03	1.11E+03
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹⁰⁶ Ru	2.91E+03	pCi/L	5.23E+03	U	9.29E+03	4.65E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹⁰⁶ Ru	2.76E+02	pCi/L	1.67E+03	U	6.04E+03	3.02E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹⁰⁶ Ru	4.65E-01	pCi/L	2.18E+03	U	8.56E+03	4.28E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹⁰⁶ Ru	1.13E+03	pCi/L	3.27E+03	U	9.04E+03	4.52E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹⁰⁶ Ru	2.89E+03	pCi/L	6.04E+03	U	1.30E+04	6.50E+03
CP10110101X3	WM-184 TR-55	3CD24	Gamma	¹²⁵ Sb	6.98E+04	pCi/L	5.87E+03		4.99E+03	2.50E+03
CP10110201X3	WM-184 TR-57	3CD31	Gamma	¹²⁵ Sb	3.50E+04	pCi/L	3.52E+03		3.34E+03	1.67E+03
CP10110301X3	WM-184 TR-58	3CD37	Gamma	¹²⁵ Sb	4.71E+03	pCi/L	6.10E+03	U	4.75E+03	2.38E+03
CP10110401X3	WM-184 TR-58	3CD43	Gamma	¹²⁵ Sb	8.31E+04	pCi/L	6.48E+03		4.93E+03	2.47E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	¹²⁵ Sb	1.39E+05	pCi/L	1.20E+04		6.68E+03	3.34E+03
CP10110101X4	WM-184 TR-55	0312019-01	Special	⁹⁰ Sr	2.59E+06	pCi/L	1.62E+04		2.87E+03	1.44E+03
CP10110201X4	WM-184 TR-57	0312019-02	Special	⁹⁰ Sr	2.75E+06	pCi/L	1.13E+04		2.37E+03	1.19E+03
CP10110301X4	WM-184 TR-58	0312019-03	Special	⁹⁰ Sr	3.21E+06	pCi/L	1.13E+04		2.40E+03	1.20E+03
CP10110401X4	WM-184 TR-58	0312019-04	Special	⁹⁰ Sr	2.51E+06	pCi/L	8.70E+03		2.47E+03	1.24E+03
CP10110501X4	WM-184 TR-58	0312019-05	Special	⁹⁰ Sr	3.01E+06	pCi/L	8.75E+03		2.62E+03	1.31E+03
CP10110101EA	WM-184 TR-55	3CD26	*ICP-MS ⁹⁹ Tc	⁹⁹ Tc	9.56E+02	pCi/L				
CP10110201EA	WM-184 TR-57	3CD33	*ICP-MS ⁹⁹ Tc	⁹⁹ Tc	7.25E+02	pCi/L				
CP10110301EA	WM-184 TR-58	3CD39	*ICP-MS ⁹⁹ Tc	⁹⁹ Tc	1.13E+03	pCi/L				
CP10110401EA	WM-184 TR-58	3CD45	*ICP-MS ⁹⁹ Tc	⁹⁹ Tc	7.78E+02	pCi/L				
CP10110501EA	WM-184 TR-58	3CD51	*ICP-MS ⁹⁹ Tc	⁹⁹ Tc	6.12E+02	pCi/L				

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²³⁴ U	2.20E+02	pCi/L	1.07E+02	J	5.97E+01	2.99E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²³⁴ U	2.09E+02	pCi/L	1.00E+02	J	1.02E+02	5.10E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁴ U	3.07E+02	pCi/L	1.22E+02	J	4.62E+01	2.31E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁴ U	3.66E+02	pCi/L	1.48E+02	J	9.17E+01	4.59E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁴ U	2.82E+02	pCi/L	1.58E+02	U	2.62E+02	1.31E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	²³⁵ U	9.91E+04 ^e	pCi/L	1.35E+04		2.38E+03	1.19E+03
CP10110201X3	WM-184 TR-55	3CD31	Gamma	²³⁵ U	3.32E+04 ^e	pCi/L	3.38E+03		1.48E+03	7.40E+02
CP10110301X3	WM-184 TR-57	3CD37	Gamma	²³⁵ U	7.99E+04 ^e	pCi/L	1.25E+04		2.14E+03	1.07E+03
CP10110401X3	WM-184 TR-57	3CD43	Gamma	²³⁵ U	8.06E+04 ^e	pCi/L	8.80E+03		2.18E+03	1.09E+03
CP10110501X3	WM-184 TR-58	3CD49	Gamma	²³⁵ U	1.48E+05 ^e	pCi/L	1.51E+04		2.88E+03	1.44E+03
CP10110101X3	WM-184 TR-58	3CD24	Alpha	²³⁵ U	1.98E+01	pCi/L	3.23E+01	U	1.44E+02	7.20E+01
CP10110201X3	WM-184 TR-58	3CD31	Alpha	²³⁵ U	6.33E+01	pCi/L	9.73E+01	U	1.42E+02	7.10E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁵ U	2.15E+01	pCi/L	3.35E+01	U	5.82E+01	2.91E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁵ U	7.38E+01	pCi/L	1.08E+02	U	1.15E+02	5.75E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁵ U	1.37E+02	pCi/L	2.11E+02	U	2.73E+02	1.37E+02
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²³⁶ U	0.00E+00	pCi/L	0.00E+00	U	5.97E+01	2.99E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²³⁶ U	6.98E+01	pCi/L	1.04E+02	U	1.13E+02	5.65E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁶ U	0.00E+00	pCi/L	0.00E+00	U	4.62E+01	2.31E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁶ U	4.10E+01	pCi/L	5.88E+01	U	5.56E+01	2.78E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁶ U	1.37E+02	pCi/L	2.12E+02	U	2.68E+02	1.34E+02
CP10110101X3	WM-184 TR-55	3CD24	Alpha	²³⁸ U	0.00E+00	pCi/L	0.00E+00	U	5.97E+01	2.99E+01
CP10110201X3	WM-184 TR-57	3CD31	Alpha	²³⁸ U	0.00E+00	pCi/L	0.00E+00	U	5.30E+01	2.65E+01
CP10110301X3	WM-184 TR-58	3CD37	Alpha	²³⁸ U	4.87E+01	pCi/L	7.18E+01	U	7.62E+01	3.81E+01
CP10110401X3	WM-184 TR-58	3CD43	Alpha	²³⁸ U	0.00E+00	pCi/L	0.00E+00	U	5.56E+01	2.78E+01
CP10110501X3	WM-184 TR-58	3CD49	Alpha	²³⁸ U	1.01E+02	pCi/L	1.52E+02	U	1.62E+02	8.10E+01
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁶⁵ Zn	-8.69E+02	pCi/L	1.13E+03	U	8.77E+02	4.39E+02

Table I-1. (continued).

Field Sample ID	Location	Lab Sample ID	Analysis	Compound	Result	Units	Uncertainty	Validator Flag ^a	MDA ^b	1/2 MDA ^c
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁶⁵ Zn	1.18E+02	pCi/L	2.13E+02	U	3.98E+02	1.99E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁶⁵ Zn	-4.53E+02	pCi/L	6.54E+02	U	7.89E+02	3.95E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁶⁵ Zn	1.36E-01	pCi/L	2.08E+02	U	8.47E+02	4.24E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁶⁵ Zn	-9.06E+02	pCi/L	1.32E+03	UJ	1.63E+03	8.15E+02
CP10110101X3	WM-184 TR-55	3CD24	Gamma	⁹⁵ Zr	2.22E+03 ^e	pCi/L	2.52E+02		1.23E+03	6.15E+02
CP10110201X3	WM-184 TR-57	3CD31	Gamma	⁹⁵ Zr	9.48E+02 ^e	pCi/L	1.04E+02		5.23E+02	2.62E+02
CP10110301X3	WM-184 TR-58	3CD37	Gamma	⁹⁵ Zr	2.22E+03 ^e	pCi/L	2.53E+02		1.28E+03	6.40E+02
CP10110401X3	WM-184 TR-58	3CD43	Gamma	⁹⁵ Zr	2.37E+03 ^e	pCi/L	2.55E+02		1.19E+03	5.95E+02
CP10110501X3	WM-184 TR-58	3CD49	Gamma	⁹⁵ Zr	6.78E+03 ^e	pCi/L	7.30E+02	J	2.75E+03	1.38E+03

a. Validator flags:

J=Estimated value

U=Analyte was analyzed for but was not detected.

b. MDA=Minimum detectable activity.

c. Used for statistical analysis when result reported is not statistically positive.

d. Radionuclide result is a false-positive. ⁹⁵Nb, ¹⁰³Ru, and ⁹⁵Zr have a short half-life (35, 39, and 64 days, respectively) isotope and are known not to be present due to the age of the tank wastes.e. Gamma spectrometry result is a false-positive due to ¹³⁷Cs backscatter (Storms 2004).